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ABSTRACT

Deficiencies in the education of United States students transferring from foreign medical schools to United States medical schools and the success of programs devised to remedy or reduce these deficiencies were studied. The background to the study and its objectives are considered, and case studies are presented that provide detailed information on the content of programs for the transfers, as authorized by Section 782 of the Health Professions Educational Assistance Act of 1976. The study also compared the performance of the transfer students attending United States medical schools. One major study objective was to determine what resources are required to bring these United States foreign medical students up to American standards. Factors contributing to the large number of United States students attending foreign medical schools and recent studies conducted on the foreign medical education of United States students are considered. An executive summary of the final study report and an appendix that summarizes key characteristics of the 19 programs are included. (SW)

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FINAL REPORT

ANALYSIS OF DEFICIENCIES IN THE FOREIGN MEDICAL EDUCATION OF U.S. FOREIGN MEDICAL STUDENT TRANSFEREES

Volume I
Executive Summary

Submitted to:

Health Resources Administration

HE 012 913

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Macro Systems, Inc.

April 23, 1979

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Section 782 of the Health Professions Educational Assistance Act of 1976 (Public Law 94-484) authorized grants to schools of medicine and osteopathy to conduct programs for the training of U.S. citizens who have transferred or who hope to transfer with advanced standing to American schools from foreign medical schools. Two categories of students were to be served by the program:

- Category I--Students who had applied for transfer to a U.S. medical school but had not yet taken or passed the National Board of Medical Examiners (NBME) Part I examination.
- Category II--Students who had been accepted by a U.S. medical school but whose foreign medical education did not prepare them adequately for entering the third year of a U.S. medical school.

The law further directed the Secretary to compile the reports submitted by the schools and submit an analysis and evaluation of the information contained therein to Congress.

To meet this reporting requirement, the Division of Medicine, Bureau of Health Manpower of the Health Resources Administration contracted with Macro Systems, Inc., to conduct an analysis of reports and data submitted by participants in the program. The analysis was intended to meet the following objectives:

- Identify and classify deficiencies in the foreign medical education of U.S. foreign medical students (USFMS) served by the program.
- Compare the performance of the USFMS with the performance of U.S. medical students (USMS).
- Determine the success of the grantees in remedying the educational deficiencies of the transferees.
- Determine changes required in the curricula and teaching methods of U.S. medical schools to meet the needs of the USFMS transferees.

- Assess the impact of the USFMS and their associated skill and knowledge deficiencies on the U.S. undergraduate medical education system.

In providing the above analyses, the report is intended to address two basic questions:

- What are the deficiencies in the foreign medical education of USFMS?
- What resources are required to bring these USFMS up to American standards?

1. APPROACH AND LIMITATIONS OF THE STUDY

Due to the time constraints of the study, a secondary data analysis approach was used. The analysis focused primarily on data collected by the grantees. New data collection was not undertaken, and no direct observation of the USFMS or the foreign medical schools was attempted.

A key aspect of the approach was the selection of methods to characterize and measure deficiencies. Recognizing that students' performance characteristics could not necessarily be attributed to their foreign medical education, several measures were used, including:

- Absence of required courses (as judged by U.S. standards) from the curricula of foreign medical schools
- Quality of curricula, teaching methods, faculty, and facilities of foreign medical schools as reported by USFMS and grantee faculty
- Student performance on the National Board of Medical Examiners Part I examination--primarily a measure of basic science skills
- Student performance on evaluations administered by the grantees themselves--primarily a measure of clinical skills

Because the results presented in this report are based on secondary data analysis, a rigorous experimental design was not possible. Consequently, there are certain limitations in the interpretation and generalizability of the findings. Major limitations include the following:

- Limited Study Population--The study population was limited to the USFMS who participated in the 19 grantee programs. The majority were Category II students who had already succeeded in transferring to U.S. medical schools and thus cannot be

considered representative of the total group of Americans who study medicine in foreign countries. Furthermore, the criteria for admission to Category II programs were fairly restrictive, e.g., students were required to have passed the NBME Part I examination. Accordingly, such students may be considered the "cream of the crop" of U.S. citizens studying abroad.

- Problems In Interpretating Data On Foreign Medical School Curricula--Our primary curricular data sources were foreign medical school transcripts and anecdotal reports of transfer students. Neither source alone was sufficient to support definite conclusions about the deficiencies of foreign medical curricula. For example, in some cases a foreign medical school appeared to have included a course, at least from a review of the transcripts, but students might indicate that the course actually was inadequate. Thus, while anecdotal data submitted by USFMS and grantees proved a rich source of information on foreign medical school curricular and teaching methods, such data are somewhat limited in their usefulness because: (1) the number of USFMS and faculty expressing views, the topics on which views were expressed, and the depth of information provided were limited and also varied extensively by grantee and foreign medical school; (2) the USFMS transfer may be a biased source of information; and (3) the number of USFMS from any one of the foreign medical schools is usually very small (i.e., fewer than four for 74 percent of the foreign schools).

- Lack Of Comparable Data On Student Performance--One of the principal ways of identifying possible deficiencies in the foreign medical education of USFMS is to review the performance of USFMS on NBME Part I examinations and clinical tests administered by the grantees. Although the NBME Part I tests are standardized, the examinations administered by U.S. medical schools to measure competence in clinical skills and knowledge of other medical subjects are not. Variation exists in: (1) the skill areas that are measured, (2) the standards against which skills are measured, and (3) the types of testing methods and instruments used. Because of this, deficiencies in terms of performance of USFMS in clinical skill areas could only be measured against the individual grantee standard.

- External Factors Affecting Student Performance--Certain factors that we suspect may have influenced USFMS performance could not be

controlled or measured in this study. While selected undergraduate variables were measured, other factors likely to influence performance such as self-study undertaken by the student, class attendance, and other motivational factors were not. The absence of such data makes it difficult to establish a complete picture of deficiencies in foreign medical education.

Many of the above limitations were anticipated at the outset of the study; similar problems are found in any research effort which relies heavily on secondary data analysis. Despite these problems, the major objectives of the study were met. Important policymaking information has been obtained on the characteristics of the foreign medical education of USFMS, the performance of these students on both standardized and nonstandardized examinations, and the impact of such students on the U.S. medical schools' curricula, faculty load, teaching methods, etc.

2. FINDINGS

Our findings are that the performance of USFMS transfers reflects major deficiencies in the clinical sciences but relatively modest deficiencies in the basic sciences.

In the basic sciences (anatomy, physiology, pathology, etc.) a comparison of the NBME Part I scores of transfer students and U.S. medical students revealed no significant differences. In fact, the mean "Total" score for Section 782 students was 509 compared to a mean of 500 for the U.S. reference group. Only in one of seven areas (behavioral science) did the 782 students score significantly lower than the U.S. norm.

Consistent with the NBME results, a review of USFMS transcripts revealed that the great majority of required basic science courses were present in foreign medical school curricula. Behavioral science was the only course with an absence rate greater than 11 percent. However, anecdotal comments supplied by the transfer students and grantee faculty pointed to less obvious deficiencies in basic science curricula, teaching methods, faculty, and facilities. For example many students noted the absence or limited emphasis on laboratory work in such courses as anatomy, physiology, microbiology, and pathology. Instruction in dissection was considered weak; the difficulty of obtaining satisfactory cadavers was noted. Further, laboratory equipment and facilities, audiovisual equipment, and teaching aids used in support of basic science instruction were considered deficient by many students. Some students complained about the emphasis on lectures and "rote" learning as opposed to problem-oriented approaches, practical experience, and student-faculty interaction. Although the extent of deficiencies (as noted by USFMS) varied somewhat between Mexican and European medical schools, there are enough

common items to suggest that foreign medical education in the basic sciences would not meet the standards of many U.S. medical schools.

Thus, there does not seem to be a strong relationship between the basic science instruction provided by foreign medical schools and the performance of USFMS on the NBME Part I examination. The results suggest that although certain deficiencies do exist in the basic science education of USFMS, the students apparently were able to compensate for these through self-study and thus to perform well on the Part I examination.

Deficiencies in the foreign medical education of Section 782 students appear considerably greater in the clinical area. An analysis of student transcripts revealed that the USFMS received relatively limited training in clinical skills in the first two years of medical school. Training in physical examination, medical history taking, physical diagnosis, case presentation and report writing, and the use of instruments was reported deficient by many of the transfer students. Unlike the basic sciences, these deficiencies were corroborated by clinical examinations that many grantees gave the USFMS upon their entry into the remedial programs.

A comparison of the pre- and post-course scores transfer students received on clinical examinations administered by grantees suggests that the schools were successful in remedying student deficiencies. Grantees indicated that the great majority of transfer students were functioning at the level required by their respective schools at the conclusion of the remedial program. In addition, the Category I students, who subsequently took an official NBME Part I examination, showed a significant improvement in six of the eight areas. Their post-course scores were comparable to the mean of U.S. medical students.

The grantees indicated that the resources utilized in conducting the program were relatively modest. The average size of the grant among the 19 programs was approximately $54,000, a relatively small amount compared to the annual budgets of most medical schools. While the figure does not reflect actual expenditures, it is considered a reasonable approximation of program costs.

The grantees reported that the impact of the USFMS on their curricula, teaching methods, and faculty was relatively small. The remedial programs necessitated only limited changes in curricula and very few additions of new faculty. Many of the grantees described the program as an extension of services that their schools normally provide (or should be providing) for indigenous students. In fact, several grantees reported that they intended to incorporate selected features of the remedial program into the regular medical curriculum.

FINAL REPORT

ANALYSIS OF DEFICIENCIES IN THE FOREIGN MEDICAL EDUCATION OF U.S. FOREIGN MEDICAL STUDENT TRANSFEREES

Volume II

Submitted to:

Health Resources Administration

Macro Systems, Inc.

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I. BACKGROUND AND OBJECTIVES

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This chapter describes the issues and events that led to the requirement for a study and report on deficiencies in the foreign medical education of United States foreign medical students (USFMS). Specifically, the following topics are discussed:

- Factors contributing to the large number of U.S. students attending foreign medical schools
- Recent studies conducted on the foreign medical education of USFMS and related topics
- Programs devised to remedy or reduce USFMS deficiencies, particularly the subject Section 782 program created by Public Law 94-484
- The purpose and objectives of this study

1. SEVERAL FACTORS HAVE CONTRIBUTED TO THE LARGE NUMBER OF U.S. STUDENTS ATTENDING FOREIGN MEDICAL SCHOOLS

In 1976, the year the Health Professions Educational Assistance Act was passed, 42,155 individuals applied to U.S. medical schools. Only 15,774 or approximately 37 percent were accepted, leaving 26,381 applicants without placement.[1] Generally, medical educators recognize that for every student accepted by a U.S. medical school, there may be one unaccepted applicant who is qualified to study medicine (at least this has been the recent estimate). In the last several years, many of these students have chosen to attend foreign medical schools rather than sacrifice their hopes of ever becoming physicians.

Previous studies have shown that the admission criteria of foreign medical schools are far less restrictive than those of U.S. medical schools. In fact, the mean grade point average for students admitted to U.S. medical schools in 1976 was 3.46, while the comparable mean for U.S. students who were accepted at foreign medical schools and subsequently applied for transfer to a U.S. school was 2.78. Medical College Admissions Test (MCAT) scores were also lower for the foreign medical school group--a mean of 549 for all MCAT areas vs a mean of 591 for students admitted to U.S. schools. Although the foreign medical schools entered by many U.S. citizens may require a 3.00 grade point average and a minimum score of 500 on the MCATs, these standards are frequently relaxed.

1/ Travis C. Gordon and Davis G. Johnson, Ph.D., "Study of U.S. Medical School Applicants, 1975-1976," Journal of Medical Education 52 (September 1977) pp. 707-730.

An additional incentive for U.S. students to attend foreign medical school is the appreciably lower tuition. Except for proprietary schools such as Guadalajara in Mexico, tuition at foreign medical schools has remained very modest compared to tuition charged by U.S. medical schools. In many foreign medical schools, the annual tuition in 1976 was less than $1,000. Some of the French and Italian medical schools were free or required only a nominal fee (around $100). Even Guadalajara's 1976 tuition of $5,000 was not inordinately high by United States private university standards. Thus, for some U.S. citizens choosing to study medicine in foreign medical schools, economic factors may have been important, if not decisive.

Given the circumstances described above, it is not surprising that, at this time, an estimated 6,000 to 10,000 United States citizens are studying medicine in foreign medical schools. Each year, approximately 1,000 of these students attempt to transfer to U.S. medical schools after two to four years of foreign medical education.

2. DEFICIENCIES IN THE FOREIGN MEDICAL EDUCATION OF U.S. CITIZENS WHO TRANSFER OR GRADUATE FROM FOREIGN MEDICAL SCHOOLS HAS BEEN A MATTER OF CONTINUING CONCERN

The adequacy of the foreign medical education received by USFMS and the subsequent performance of these students upon transfer to U.S. schools or upon graduation from foreign schools have been subjects of continuing concern. Various studies have been conducted and articles written on this topic. For instance:

- W. F. Dube's Trend Study of Coordinated Transfer Application System (COTRANS) Participants, 1970 through 1976 indicated that the mean NBME Part I scores of applicants for transfer was consistently lower than the mean of the U.S. reference group. Although the mean for COTRANS participants increased from 464 in 1972 to 489 in 1975, it plateaued at 483 in 1976, still a full 17 points below the mean of 500 scored by the Candidate Reference Group from U.S. medical schools.[2]

- Writing in the June 9, 1975 issue of the Journal of the American Medical Association, Richard L. Egan (then associated with the Department of Undergraduate Medical Education of the American Medical Association) summarized the deficiencies in foreign medical education commonly perceived by concerned educators in the U.S. Mainly on the basis

2/ W.F. Dube, Trend Study of Coordinated Transfer Application System (COTRANS) Participants, 1970 through 1976 (Washington, D.C.: Association of American Medical Colleges, December 1977).

of experience and anecdotal reports from transfer students, members of the U.S. medical community had noted that:[3]

- Foreign medical schools tend to have large student bodies and relatively small faculties.
- Accordingly, foreign medical school resources for teaching the basic sciences are limited, a circumstance reflected by the limited laboratory opportunities available to students.
- Moreover, a typical foreign medical school cannot provide the carefully supervised bedside teaching that has come to characterize the U.S. system. And, in many cases, foreign schools defer all bedside teaching whatsoever until after completion of the fourth year of medical school.

Noting that many USFMS eventually find their way back to the U.S. medical system, Egan recommended that additional mechanisms be developed for separating the qualified from the unqualified and for assisting the latter to enter U.S. medicine at the earliest possible time.

These early assessments pointed to the apparent nature and extent of deficiencies in the foreign medical education of USFMS and to the need for remedying these deficiencies before students return to the American system.

Several recent studies address these issues. In the October 19, 1978, issue of the New England Journal of Medicine, Weinberg and Bell[4] report that the test scores of USFMS who transfer to U.S. medical schools with advanced standing deteriorate over time. Specifically:

- o The mean score on NBME Part I for a sample of 201 USFMS who took the test in 1974 was 507 or 7 points higher than the total test mean for the U.S. reference group. Of these 210 USFMS, 112 passed on the first try, 110 on the second, eight on the third, and one never passed.

3/ Richard L. Egan, M.D., "U.S. Citizens and Foreign Medical Schools," Journal of The American Medical Association (JAMA), 232, No. 10 (June 9, 1975), pp. 1028-1030.
4/ Ethel Weinberg, M.D., and Anita I. Bell, Ph.D, "Performance of United States Citizens with Foreign Medical Education on Standardized Medical Examinations," The New England Journal of Medicine, 200 No. 16 (October 19, 1978), pp. 858-862.

- On the NBME II, the mean for the same group (minus two individuals) was 478, significantly lower than the mean of 500 achieved by the reference group. This time, 198 individuals passed on the first attempt and one individual passed on the second try.

- On the NBME III, the mean total score for the same group (minus nine individuals) was 464, significantly lower than the mean of 500 achieved by the Part III reference group.

Although the authors do not make firm conclusions about the quality of the USFMS or of foreign medical education solely on the basis of these findings, they do use the data to suggest that "it is possible that such performance is due to a limitation in ability of those who were not admitted to the freshman year of United States medical school, or to a decrease in motivation of the USFMS after being admitted to advanced standing, or to inferior knowledge of the basic sciences."

The negative implications suggested by Weinberg and Bell have been criticized by numerous Journal correspondents, most of them pointing to data limitations and to certain flaws in the analysis (e.g., the fact that the USFMS under study were unevenly distributed among U.S. medical schools). A subsequently published paper (Mulvihill and Rosner)[5] suggests that Americans who have studied and graduated abroad can be helped to become productive members of the medical community through a well-organized and closely supervised year of clinical training. The authors criticize reliance on standardized tests as the primary mode for evaluating performance and recommend such supplementary techniques as direct questioning of the professionals in charge of undergraduate clinical and graduate medical education.

Using this mode of assessment, the authors themselves studied the performance of 140 individuals who had attended a Fifth Pathway program operated by two New York Hospitals.[6] Performance evaluations of 129 of these students indicated that:

5/ James E. Mulvihill and Fred Rosner, Journal of the American Medical Association (JAMA), 241, No. 7 (16 February 1979), pp. 714-716.

6/ The Fifth pathway represents one route that USFMS may take to enter the American Medical System. It requires (1) completion of the didactic portion of a foreign medical program; (2) attaining a score satisfactory to the sponsoring U.S. Medical School on a screening examination acceptable to the Liaison Committee on Graduate Medical Education; and (3) completion of an academic year of supervised clinical training under due sponsorship of a U.S. medical school.

- Some 39 percent were ranked "very good or excellent" in clinical performance.
- Another 47 percent were ranked "average to good."
- And 14 percent were described as "inadequate or below average."

The authors conclude that carefully selected and motivated USFMS can be assisted to become good physicians, both clinically and academically.

Again, the issue of remediation is raised but not answered by the Mulvihill and Rosner article. Specifically, what is required to bring these students up to speed and at what point is remediation most effective--after two years of foreign medical school or after four? Also, do students from different foreign medical schools require different types and intensities of remediation?

The question of deficiencies in foreign medical education itself (vs the ability of the U.S. students attending foreign medical school) has become increasingly central. Various studies have shown that an appreciable number of U.S. citizens who apply to foreign medical schools are well qualified--at least in terms of undergraduate GPA, MCAT scores, and other standardized measures. Through self-study, these students may do quite well on subsequent standardized tests, specifically the NBME I. However, the foreign medical education they receive may constitute inadequate preparation for subsequent clinical training or for medical practice in the U.S. A recent article in FORUM on Medicine[7] emphasizes this issue when describing the proprietary schools that are being developed in various Caribbean locations to serve U.S. citizens seeking a medical education. Without large permanent facilities, with very limited laboratory facilities, and with insufficient resources for teaching clinical skills, these schools cannot be expected to provide an adequate medical education by American standards.

Collectively, the above studies, while not conclusive or uniform in their findings, point to significant potential deficiencies in the foreign medical education of USFMS. To address these deficiencies, Congress and HEW as well as the U.S. medical community have developed a number of key programs, as described in the next section.

7/ Susan V. Lawrence, "New Medical Schools Chartered in Caribbean Begin Classes--Sometimes Amid Legal Disputes," Forum on Medicine (October 1978) pp. 19-24.

3. THE COORDINATED TRANSFER APPLICATION SYSTEM (COTRANS) AND, MORE RECENTLY, THE SECTION 771(b)(3) OF P.L. 94-484 HAVE ATTEMPTED TO DISTINGUISH AND ASSIST QUALIFIED USFMS

As early as 1970, the U.S. medical community and Federal policymakers were beginning to feel considerable pressure from USFMS who wanted to transfer to American schools rather than delay their entry into American medicine until after they became foreign medical graduates (FMGs). In response to appeals from this group and other concerned parties, the Association of American Medical Colleges (AAMC) and the National Board of Medical Examiners (NBME) jointly established the Coordinated Transfer Application System (COTRANS). The COTRANS system establishes eligibility for taking the NBME Part I examination, sponsors selected USFMS for this examination, then disseminates information on the students and their test scores to interested medical schools. Thus COTRANS is basically a voluntary system for facilitating the reentry of USFMS into the American medical school system.

The Health Professions Educational Assistance Act of 1976 (Public Law 94-484) created an additional and more powerful mechanism for aiding in the transfer process. Specifically, as a condition for receiving capitation payments, Section 771(b)(3) of the Act requires schools of medicine to assure that they will reserve positions for U.S. citizens who were enrolled in foreign medical schools before October 12, 1976, and who (1) had successfully completed at least two years at said schools, and (2) had successfully completed Part I of the NBME examination. The Secretary of HEW was directed to identify eligible students no later than August 15 of 1977, 1978, and 1979 and to apportion a number of positions among the medical schools adequate to meet the needs of these students.8

As many observers have noted, the NBME Part I examination is not sufficient for assessing the long-term effectiveness of a medical student's education in basic science or his/her preparation for entering the clinical years of training. Although Section 771(b)(3) attempts to distinguish qualified from unqualified candidates for transfer, it relies almost entirely on the NBME Part I examination for this purpose. Accordingly, it does not deal with the deficiencies that may exist in the foreign medical education of selected USFMS, despite their having passed the NBME Part I examination.

8/ As amended by P.L. 95-83, the Health Professions Educational Assistance Act requires a medical school to increase its third year enrollment only in the 1978-1979 school year by 5 percent over the preceding year's first or third year enrollment, whichever is less. Students completing two years in special U.S. education programs and students in American Ph.D-M.D. programs as well as USFMS may be counted toward this requirement.

4. SECTION 782 OF P.L. 94-484 WAS SPECIFICALLY DESIGNED TO ADDRESS DEFICIENCIES IN THE FOREIGN MEDICAL EDUCATION OF USFMS

To address the problem of foreign medical school deficiencies more directly, Congress added a provision to Public Law 94-484 that made funds available for the transitional education of returning USFMS. Under Section 782, the Secretary of HEW was authorized to make grants to U.S. schools of medicine and osteopathy to plan, develop, and operate programs that would: (1) train United States citizens who were students in foreign medical schools before the date of enactment of the Health Professions Educational Assistance Act of 1976 to enable them to meet the requirements for enrolling in schools of medicine or osteopathy in the States as full-time students with advanced standing; or (2) train United States citizens who have transferred from foreign medical schools (which they attended before the date of enactment of the Health Professions Educational Assistance Act of 1976) and have enrolled in schools of medicine or osteopathy in the States as full-time students with advanced standing. The two classes of U.S. medical students that may be assisted under these Section 782 grants have come to be known as Category I and Category II students. For the most part, Category I students are given instruction in the basic sciences to equip them for taking and passing the NBME Part I examination. The remedial instruction provided Category II students who have already passed NBME I and who have been accepted by a U.S. school, is more likely to focus on deficiencies in the clinical skills not typically covered in the early years of foreign medical school.

5. TO MEET THE LEGISLATIVE REPORTING REQUIREMENTS OF THE SECTION 782 PROGRAM, HEW COMMISSIONED A STUDY TO COMPILE AND ANALYZE DATA ON DEFICIENCIES IN THE FOREIGN MEDICAL EDUCATION OF USFMS

In Fiscal Year 1978, 19 U.S. medical schools were awarded grants to conduct Section 782 programs--one to operate a Category I program and the others to operate Category II programs. The 19 schools of medicine receiving Section 782 funds were required to submit to the Secretary of HEW a report on the deficiencies (if any) identified by the school in the foreign medical education of the students trained under the grant program. In addition, the law directs the Secretary to compile the reports submitted by participating schools and to forward his analysis and evaluation of the information contained therein to Congress.

To meet these reporting requirements, the Health Resources Administration (HRA), Bureau of Health Manpower, Division of Medicine, contracted with Macro Systems, Inc., to review and analyze the reports and data submitted by the 19 grantees participating in the Section 782 program. The analysis was to consider only reports and data currently available at HRA or at

the grantee sites; no new data collection was to be undertaken. Based on the analysis, Macro was to prepare a final report containing the following items:

(1) An analysis of the student data in each grantee submission to:

- o Identify and classify deficiencies in the foreign medical education of USFMS transfers
- o Compare the performance of transfers, both before and after the remedial Section 782 programs, with the performance of USMS

(2) An analysis of program data provided by each grantee to determine:

- o Required changes in curricula and teaching methods of U.S. medical schools to meet the needs of transfers. Changes could relate to: faculty load, faculty size, faculty composition, admission policies, testing and evaluation methods, and resulting medical education costs.
- o Cumulative impact of U.S. foreign medical students and their associated skill and knowledge deficiencies on the U.S. undergraduate medical education system.

In conjunction with other information, the study was also intended to support analysis of two related issues: (1) to determine with more precision the need for training programs to upgrade the skills, knowledge, and competence of USFMS; and (2) to identify significant criteria to use in determining whether and how to extend the program.

* * * * * *

The reader should be aware of our operating definition of the term "deficiency." As used in this report, "deficiency" may be associated with foreign medical education itself and/or with the performance of USFMS.

(1) Foreign medical education itself may be deficient as indicated by:

- o The absence of a "required" course from the foreign medical curriculum. Practically speaking, the term "required" must be defined from the perspective of the U.S. medical school, i.e., to what extent does the curriculum of the foreign medical school correspond to the curriculum of the curriculum of the U.S. medical school that has accepted the USFMS. For purposes of this analysis, "required" was defined to include anatomy, physiology, biochemistry, pathology, microbiology, pharmacology, and behavioral sciences. The foreign medical school transcripts and grantee interviews with the USFMS were the major sources of this information.

- o The timing of a "required" course in the foreign medical curriculum. In some cases, there are discrepancies between course schedule of foreign and U.S. schools. As a function of these discrepancies, individual students may not have taken all "required" courses before transferring to a U.S. medical school. Again, transcripts and student interviews are the major sources of this information on courses that may be missing on an individual basis, as a function of their timing.

- o The quality and/or focus of courses in the foreign medical school. The quality of instruction in specific foreign medical courses may fall short of American standards or the course content may vary considerably from American norms. In the context of this study, such deficiencies were assessed at second hand, through the anecdotal reports of USFMS and grantees.

(2) The knowledge and skills of USFMS may be deficient as indicated by:

- o Their performance on the NBME Part I compared to the performance of USMS. Here it should be emphasized that acceptable performance on this examination does not assure adequate knowledge or understanding of the basic sciences.

- o Their performance on clinical examinations administered by individual grantees.

It may be noted that deficiencies associated with the absence of a course from the curriculum or the quality and focus of instruction are, for the most part, independent of individual experience. They may be expected to affect all USFMS who attended a given foreign medical school or a given course at that school. On the other hand, courses that are absent from transcripts by virtue of their timing in the foreign medical curriculum are more likely to vary by student. Also, student performance on the NBME Part I and on clinical examinations may or may not be associated with the formal instruction received at a foreign medical school. In effect, conclusions about deficiencies in the foreign medical education of USFMS enrolled in the 1978 Section 782 Program and possibly related deficiencies in the performance of these students can be developed only through a weighing of hard data on performance and anecdotal information on the quality of the foreign medical education.

II. METHODOLOGY

II. METHODOLOGY

This chapter presents in detail the approach used in compiling and analyzing the data and in developing the final report. In addition, we discuss the principal limitations of the study.

1. APPROACH

In conducting the study, we performed several major tasks, including:

(1) Review Background Material

Initially we reviewed background material at HRA and general literature relevant to the study. This material was used to identify the key issues to be explored and to structure our analysis plan. The following material pertaining to the grant program was reviewed:

- Legislation (Section 782 of the Health Professions Educational Assistance Act of 1976) establishing the program
- Grantee application and reporting requirements
- Actual grant applications submitted by grantees

In addition, we reviewed the general literature to the foreign medical education of USFMS.

(2) Review Database

Concurrent with the review of relevant background material, we examined the database on the program maintained at HRA. In addition to data available on grant applications, this included reports submitted by grantees on USFMS performance, foreign medical school curricula, grant program characteristics, and other information pertaining to the analytic objectives of the study. This review revealed that additional information was required, and plans to obtain the necessary data were developed accordingly.

(3) Develop Analysis Plan

Based on a review of the applicable legislation, grant applications, grantee reports, and other related studies as well as discussions with HRA officials, we developed a detailed analysis plan. The plan described the following:

- Objectives of the analysis and issues to be explored
- Data required to address these issues and data sources

- o Analytical methods to be used
- o Analysis display methods
- o Limitations in analysis

(4) Assemble And Transcribe Available Data

Based on the analysis plan developed in Task 3, we began to assemble and transcribe the required data. Transcription work sheets were developed to facilitate tabulation. In addition, a data acquisition matrix was developed to permit an assessment of the availablity of required data and the need for additional contacts with grantees. Appendix F of Volume III presents a copy of the Data Acquisition Matrix.

At the outset of the project, it was evident that a majority of the grantees had not submitted any data and the few submissions in hand were insufficient for analysis. Accordingly, a detailed letter was sent to each of the 19 grantees delineating the required data and the desired submission date. Appendix F presents a copy of this letter.

In addition, follow-up telephone calls were made to each grantee to clarify data requirements and to discuss the data that had been submitted. To supplement the mailings and telephone calls, on-site visits were made to eight grantees to clarify data issues and to discuss the grantee's views about and insights into the program.

As data were obtained from grantee reports, telephone calls, and site visits, they were transcribed and organized onto work sheets. Individual student data including undergraduate GPA, MCAT scores, NBME Part I scores, and demographics were extracted from grantee submissions and entered into a computer database.

(5) Analyze Data

Data compiled on the various work sheets were analyzed in accordance with the analysis plan developed in Task 3. Detailed data on the characteristics of USFMS, their performance on the NBME Part I examination, and deficiencies in the curricular of foreign medical schools were entered into the computer for processing and analysis. The SPSS statistical package was used to develop various statistics, including means, standard deviations, frequency distributions, cross-tabulations, and correlations.

Results were tabulated by foreign medical school, country of foreign medical school, and grantee. More specifically, the following statistics were produced:

- Descriptive characteristics of the USFMS population

- Means and standard deviations of USFMS characteristics, including:

  - Undergraduate Science GPA
  - Undergraduate Overall GPA
  - MCAT
    - Verbal
    - Quantitative
    - General Information
    - Science

- Means and standard deviations of USFMS test scores on all sub-areas of the NBME Part I examination:

  - Anatomy
  - Physiology
  - Pathology
  - Microbiology
  - Pharmacology
  - Behavioral Science
  - Total

- Correlation coefficients indicating relationships:

  - Between test scores in individual subject areas (dependent variable) and student characteristics (independent variable)

  - Between test scores in different subject areas, e.g., anatomy and physiology

- Frequency distributions displaying the number of students who did not receive a particular course in their foreign medical school education

- Comparisons between NBME I test scores and the presence or absence of corresponding courses on the foreign medical school transcripts

In addition, much of the data were analyzed manually. Manual analyses included:

- A table describing the performance of USFMS on clinical skills examinations given by grantees. Results were presented in two ways: (1) percentage of USFMS who were deficient in a particular subject or skill, or (2) a notation of the skill areas in which USFMS performed significantly worse than USMS. These data were displayed by grantee.

- Tabulation of views expressed by USFMS and grantee faculty on deficiencies and strengths (if any) in the foreign medical education of USFMS

- Tables indicating the resources expended by grantees in conducting remedial programs. Such analyses were used to support an exploration of changes required in the curricula of U.S. medical schools to meet the needs of USFMS and the cumulative impact of the USFMS on undergraduate medical education. Few of the grantees reported their views on this subject, therefore, the issue was addressed by extrapolation of data on resources expended in the grant programs and the apparent impact of conducting the program.

In exploring deficiencies in the foreign medical education of USFMS, comparisons of student characteristics, NBME Part I examination scores, and clinical performance evaluations of USFMS with those of USMS were made, as appropriate and as the data allowed.

As the analyses described above were completed, findings related to the objectives of the study were developed. Additional analyses were conducted when findings suggested that further issues should be explored. All assumptions made in conducting the analyses and related limitations of the analyses were thoroughly documented.

(6) Develop Conclusions And Prepare Final Report

Based on the analyses performed in Task 5, we developed conclusions regarding the key issues of the study and prepared the Final Report. The findings section of the Final Report was organized to coincide with the specific analysis objectives of the study. To support review and understanding of study findings and conclusions, detailed descriptions (i.e., case studies) of each of the grantee programs were included.

2. LIMITATIONS OF THE STUDY

Given the scope and time constraints of the study, we approached the task of identifying deficiencies in the foreign medical education of USFMS by utilizing secondary data sources exclusively. Thus the problems inherent in any research study restricted to secondary data analysis were encountered in this effort. Problems arose from the absence of certain key data elements; inconsistency of data reported by grantees in level of detail, format, and/or terminology; and inconsistency in standards and methods used by grantees to measure student performance. In addition to these data problems, other limitations were imposed by the characteristics of the USFMS selected for the program, the variation in remedial programs conducted by grantees, and the presence of external factors,

such as self-study activities undertaken by USFMS, which may have influenced student performance but which were not collected and/or analyzed systematically.

A more detailed discussion of these study limitations follows:

(1) Limited Scope Of The Student Population

The study was limited to the 19 grantees who received funds under the Section 782 program. Many other U.S. medical schools have in the past and are currently conducting programs for USFMS transfers. Thus, the subset of programs (and students) employed in this assessment of deficiencies in the foreign medical education of USFMS is not necessarily representative of the population of USFMS who have successfully transferred to a U.S. medical school. Further, the criteria for admission to Category II grantee programs were fairly restrictive, generally requiring students to pass the NBME Part I examination. Thus, such students may not be representative of the typical USFMS educated in a foreign medical school.

(2) Problems In Interpreting Data On Foreign Medical School Curricula And Teaching Methods

As mentioned, one definition of deficiency in foreign medical education is associated with the absence of certain required courses (as judged by U.S. medical schools) from the curriculum of the foreign medical school. This approach to deficiency has certain limitations. First, there is the problem of arriving at a consensus of what constitutes a good or adequate curriculum. Based on discussions with several grantees, we developed a list of typical courses, but the subjective nature of such a list must be recognized. Second, data on courses taken by USFMS in foreign medical schools were missing in many instances. Third, there is the difficulty of judging the comprehensiveness of the course and the effectiveness of the teaching method used. Data on these variables were fairly limited. Thus, the presence of a course in a foreign medical school's curriculum does not assure that the required material was adequately taught.

Related to the above point is the fact that objectives of foreign medical schools vary widely. Such objectives are obviously influenced by the perceived needs of the foreign country in which the school is located. Because there is such variation, it is difficult to compare foreign medical schools in terms of adequacy of teaching methods, course content, etc.

Given the above factors, the absence or presence of courses in foreign medical school curricula can only suggest

possible deficiencies or strengths; definitive conclusions cannot be drawn.

Deficiencies were also analyzed by examining the views expressed by USFMS and faculty of U.S. medical schools. Such "anecdotal" data represent a rich source of information on foreign medical school curricula and teaching methods. However, when interpreting anecdotal data, we must recognize that: (1) the number of USFMS and faculty expressing views, the topics on which views were expressed, and the depth of information provided were generally limited and also varied extensively by grantee and foreign medical school; (2) the USFMS transfer may be a biased source of information; and (3) the number of USFMS from any one foreign medical school is often so small (e.g., fewer than four USFMS for 74 percent of the foreign schools) that definitive conclusions cannot be drawn.

(3) Lack Of Comparability In Measuring Student Performance

Another indicator of possible deficiencies is the performance of USFMS on NBME Part I examinations and on clinical tests administered by the grantees. Although the NBME Part I tests are standardized, the examinations administered by U.S. medical schools to measure competence in clinical skills and knowledge of other medical subjects are not. Variation exists in: (1) the skill areas that are measured, (2) the standards against which skills are measured, and (3) the types of testing methods and instruments used. Moreover, the availability of data on these topics also varied extensively among grantees. Because of this, deficiencies in the clinical performance of USFMS can best be viewed on an individual grantee basis. Unfortunately, comparative data on the performance of USMS in these same clinical areas were generally not available or had to be inferred. Thus, it was not possible to establish deficiencies in the clinical performance of USFMS through statistical analysis of "hard" data.

(4) Existence Of External Factors Influencing Student Performance

In attempting to assess deficiencies in foreign medical education through analysis of student performance the existence of several exogenous factors must be recognized. Although undergraduate performance was measured in the study, other factors likely to influence subsequent performance, such as self-study undertaken by students, were not. The absence of such data made it difficult to draw definitive conclusions about the impact of foreign medical education on USFMS knowledge and skills.

(5) Wide Variation In Grantee Programs

One of the goals of the study was to assess the effectiveness of grantee programs in remedying deficiencies in the skills and knowledge of USFMS. Several factors complicated this. First, because passing the NBME Part I examination was generally a criterion for admission to Category II programs, few if any of the USFMS were given the test again after the remedial program. Second, not all schools provided pre- and post-scores on clinical examinations with which to measure student improvement. Third, there was considerable variation among grantees in program objectives program length, teaching methods, etc. Fourth, proper experimental control groups were not employed. Thus, definitive conclusions on the relative effectiveness of the various types of grantee programs could not be drawn.

* * * * * *

The preceding paragraphs have described the principal limitations of the study. Despite these limitations, the study has produced important information about the characteristics of the foreign medical education of USFMS, the performance of these students on both standardized and nonstandardized examinations, and the impact of such students on the U.S. medical schools' curricula, faculty load, teaching methods, etc.

III. STUDY FINDINGS--GENERAL

III. STUDY FINDINGS--GENERAL

This chapter presents our overall findings on deficiencies in the foreign medical education of United States foreign medical students. Deficiencies in both basic and clinical sciences are covered as well as the impact of these deficiencies on the curricula, faculty, and other characteristics of the U.S. medical schools that conducted Section 782 programs.1 (Program characteristics and other findings for each of the U.S. medical school grantees are presented in Appendix A of Volume III.)

To facilitate review and understanding of the findings, we have organized this chapter into the following sections:

- Assumptions And Hypotheses--Discusses the assumptions made in conducting the analyses and exploring related issues. Distinctions among the U.S. medical student population, the USFMS transfers examined in the study, and the total group of U.S. citizens studying medicine abroad are described.

- Distribution Of The Study Population--Describes the distribution of the student group examined in this study by foreign medical school and by country of foreign medical school.

- Basic Science Deficiencies--Describes deficiencies in the basic medical science education of USFMS in the study group.

- Clinical Skill Deficiencies--Describes deficiencies in the clinical education of USFMS in the study group.

- Program Effectiveness--Discusses the apparent effectiveness of the grantees in remedying deficiencies.

- Impact Of The Section 782 Program On Grantees--Discusses the resources used by grantees

1/ Basic sciences here includes anatomy, physiology, biochemistry, pathology, microbiology, pharmacology, and behavioral science, i.e., course material typically covered in the first two years of the U.S. medical school curriculum. Clinical science content knowledge and procedural skills with physical examination, medical history taking, physical diagnosis, and a variety of patient care activities.

to administer the program as well as the apparent impact of the USFMS on grantee curricula, faculty workload, and other factors.

2. ASSUMPTIONS AND HYPOTHESES

The Section 782 program data must be analyzed in the broader context of the total group of U.S. citizens studying medicine in foreign countries. The sample of students investigated in the current study represents only a small percentage of the U.S. citizens enrolled in foreign medical schools. Further, the Section 782 student group represents the "tip of the iceberg," and may not be representative of the average American foreign medical student.

It is difficult to assess the quality of an educational system through the performance of its student population. From a rigorous research position, one would select a representative sample of students with appropriate control groups in order to approach this task. But the nonrepresentative nature of the Section 782 student group makes it difficult to provide experimentally defensible conclusions about the efficacy of foreign medical education. Accordingly, it is important to understand where the Section 782 group fits in the general population of U.S. citizens studying medicine--including those in U.S. medical schools and those in foreign medical schools. A conceptual model of the path that led to admission of the Section 782 transfer students by an American medical school will be helpful for this purpose.

Exhibit I, following this page, presents a model that we believe reflects the differentiation of medical student subgroups. The model incorporates a number of assumptions about differences among subgroups of U.S. citizens studying medicine, which lead to several hypotheses.

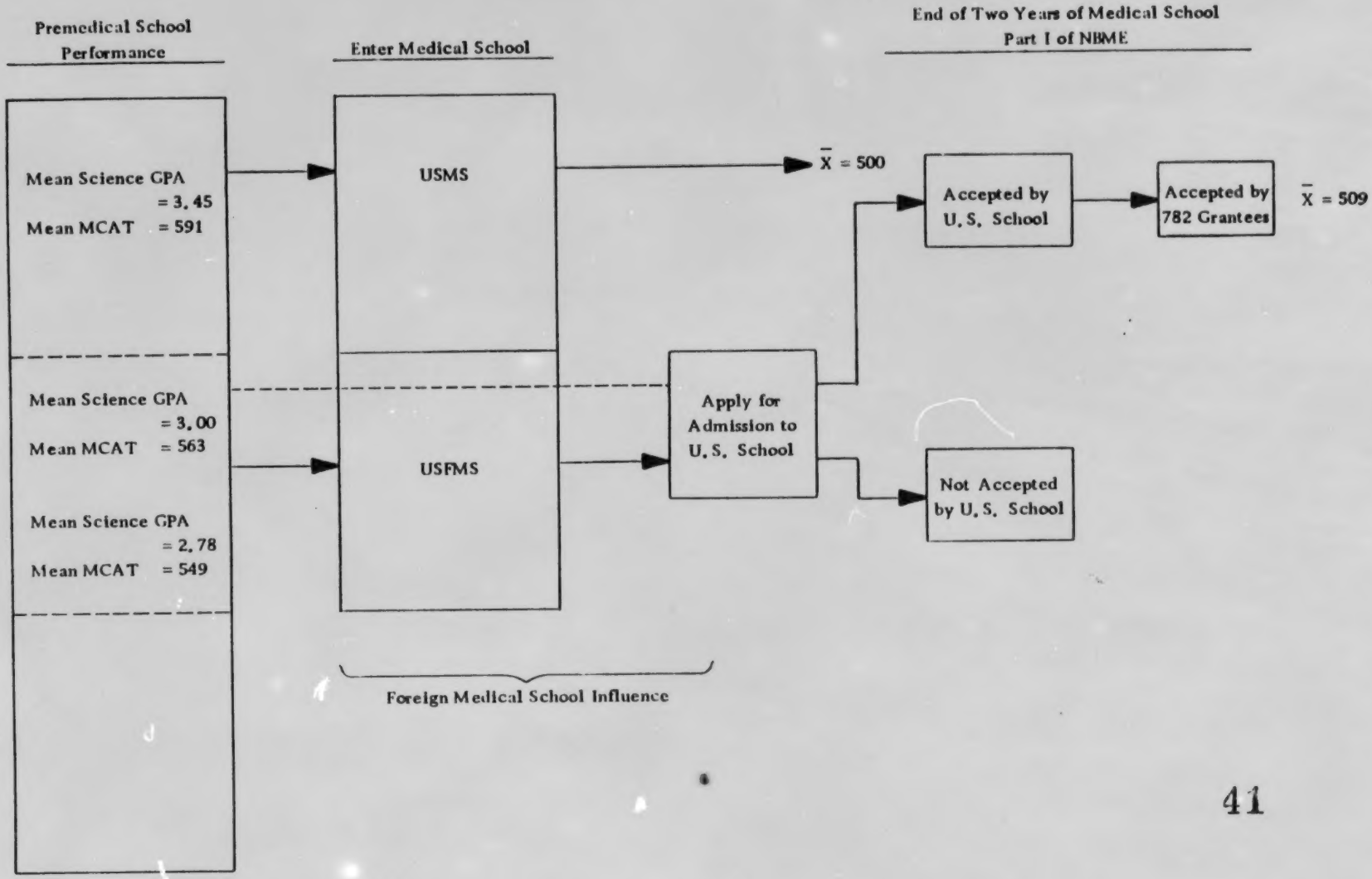
As illustrated in the exhibit, upon graduation from college, medical school candidates are generally evaluated in terms of grade point average (GPA) and Medical College Admission Test (MCAT) scores. Approximately one-third of all medical school applicants are accepted by U.S. medical schools annually. The middle third are generally considered qualified for medical school even though not accepted by a U.S. school.[2] Some unknown fraction of the rejected students apply to and are

2/ Mulvihill and Rosner, Journal of Medical Education, April, 1978.

EXHIBIT I

Health Resources Administration

USFMS TRANSFER MODEL


Premedical School Performance
Enter Medical School
End of Two Years of Medical School Part I of NBME
Mean Science GPA = 3.45
Mean MCAT = 591
USMS
X̄ = 500
Accepted by U.S. School
Accepted by 782 Grantees
X̄ = 509
Mean Science GPA = 3.00
Mean MCAT = 563
Apply for Admission to U.S. School
USFMS
Not Accepted by U.S. School
Mean Science GPA = 2.78
Mean MCAT = 549
Foreign Medical School Influence

accepted by foreign medical schools.[3] The exhibit, indicates that students accepted by U.S. medical schools (USMS) are generally from the upper tier of the premedical performance measures. Those U.S. students who study abroad (USFMS) presumably come from the middle and upper tiers, while the remaining students are filtered out of the medical school process.

After the first two years of medical school, a subset of the USFMS apply for admission to a U.S. medical school through COTRANS or as individuals. At this time, they are generally required to pass the National Board of Medical Examiners Part I examination (NBME Part I) before they are even considered for admission to most U.S. medical schools.

A second filtering process occurs when only a subset of the total USFMS group are accepted for transfer to an American medical school. Since those accepted must meet fairly rigorous admission standards, the model predicts that successful transfer students will exhibit higher NBME Part I scores than the members of their general USFMS group. Further, if the quality of foreign medical education is inferior to U.S. medical education, one would expect the basic science test results to differentiate successful USFMS transfers from USMS.

If we assume that the second filtering stage effectively differentiates two types of USFMS (those accepted for transfer by U.S. schools and those not accepted), then we must account for why two distinct groups emerge from common foreign medical experiences. One possibility is that the two groups were not equal at the point of graduation from undergraduate school. Another possibility is that the USFMS accepted for transfer have engaged in some compensatory study behavior during their foreign medical school tenure that has offset deficiencies in their foreign medical education. A third possibility is that both cases contributed to the differentiation.

In summary, the model described in Exhibit I suggests several issues related to the principal objective of the study--to analyze deficiencies in the foreign medical education of USFMS. These include:

- Are the Section 782 USFMS (the group examined in this study) representative of the total USFMS population?
- Were the USFMS and USMS at the same level of competence upon entry to medical school?

3/ Estimates of 6,000 have been made for 1977--see Weinberg and Bell.

- Are the Section 782 USFMS deficient with respect to USMS at the end of two years of medical school in foreign and U.S. schools respectively. If deficiencies are found, are these due to the quality of foreign medical education or to the limited capabilities of the USFMS?

The remainder of this section addresses these issues, (grade point average, Medical College Admission Test scores, and NBME Part I scores) to compare the Section 782 USFMS group with the general COTRANS population 4/ and with the USMS population.

The data indicate that there are clear differences in the demographic characteristics of the three population groups, namely:

- USMS--The entire group of students who entered U.S. medical schools in 1976
- USFMS--The Section 782 students in the current study (and henceforth referred to as USFMS)
- COTRANS--All students who applied for admission to a U.S. medical school through the COTRANS programs in 1976 5/

Exhibit II, following this page, presents the sex distribution and mean age for the three groups.

As indicated on the exhibit, the USFMS sex distribution is similar to that of the COTRANS population, but both groups have a smaller percentage of females than the USMS. The proportion of females in the USMS group is more than double the proportion in the COTRANS group and triple the proportion in the USFMS group.

The mean age for both USFMS and COTRANS is greater than the mean age for the USMS. This is not unexpected, since it is not uncommon for a COTRANS student to take a year's leave from foreign medical school to take an externship in the U.S. or to prepare for the NBME examination. The mean age for females is slightly greater than for males in each group.

Exhibit III, following Exhibit II, presents the mean Science GPA, Overall GPA, MCAT scores, and NBME Part I scores for the

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4/ The COTRANS population does not include the entire group of U.S. citizens studying abroad. However, it is larger than the Section 782 transfer group and is considered more representative of the USFMS universe.

5/ Ideally, we would have used 1978 COTRANS data which are more comparable to the student data in our study group, but the 1976 data are the most current available.

EXHIBIT II

Health Resources Administration

SEX DISTRIBUTION AND MEAN AGE FOR USMS, USFMS, AND COTRANS POPULATIONS

	Sex Distribution		Mean Age As Of 1978		
	Male	Female	Male	Female	Total
USMS[a]	11,852 (75%)	3,992 (25%)	24.9[c]	25.3[c]	25.0[c]
USFMS	156 (93%)	12 (7%)	27.4	27.5	27.4
COTRANS[b]	771 (90%)	81 (10%)	26.1	26.6	26.2

a/ From Gordon, T.L., and Johnson, D.C., "Study of U.S. Medical School Applicants, 1976 - 1977." J. Medical Education, 53(11), 1978.
b/ From Dube, W.F., "Trend Study of Coordinated Transfer Application System (COTRANS)," prepared for Bureau of Health Manpower, December 1977.
c/ Two years have been added to the age at admission to medical school in 1976.

EXHIBIT III

Health Resources Administration

COMPARISON OF USMS, USFMS, AND COTRANS PERFORMANCE CHARACTERISTICS

	SGPA	OGPA	VMCAT	QMCAT	GMCAT	SMCAT	Mean MCAT
USMS[a]	3.45	3.46	572	622	557	611	591
USFMS	3.00	3.01	550	582	539	580	563
COTRANS[b]	2.78	2.90	540	565	542	550	549

NBME PART I

	ANAT	PHYS	BIOC	PATH	MICR	PHAR	BHV SC	TOTAL
USMS[c]	500	500	500	500	500	500	500	500
USFMS	504	496	516	509	524	523	469	509
COTRANS[b]	415	422	423	379	402	395	375	381

NB: All differences in means are significant at the .05 level or better except where indicated.

a/ "Descriptive Study of Enrolled Medical Students 1976 - 1977," HEW, HRA. Prepared by W.F. Dube, Association of American Medical Colleges, February 1978.
b/ "Trend Study of Coordinated Transfer Application System (COTRANS) Participants, 1970 Through 1976," Final Report prepared by W.F. Dube, Association of American Medical Colleges, December 1977.
c/ Personal communication with Dr. Paul Kelly, National Board of Medical Examiners, January 1979.

EXHIBIT IV

Health Resources Administration

COMPARISON OF USMS, USFMS, AND COTRANS POPULATIONS ON PREMEDICAL PERFORMANCE SCORES

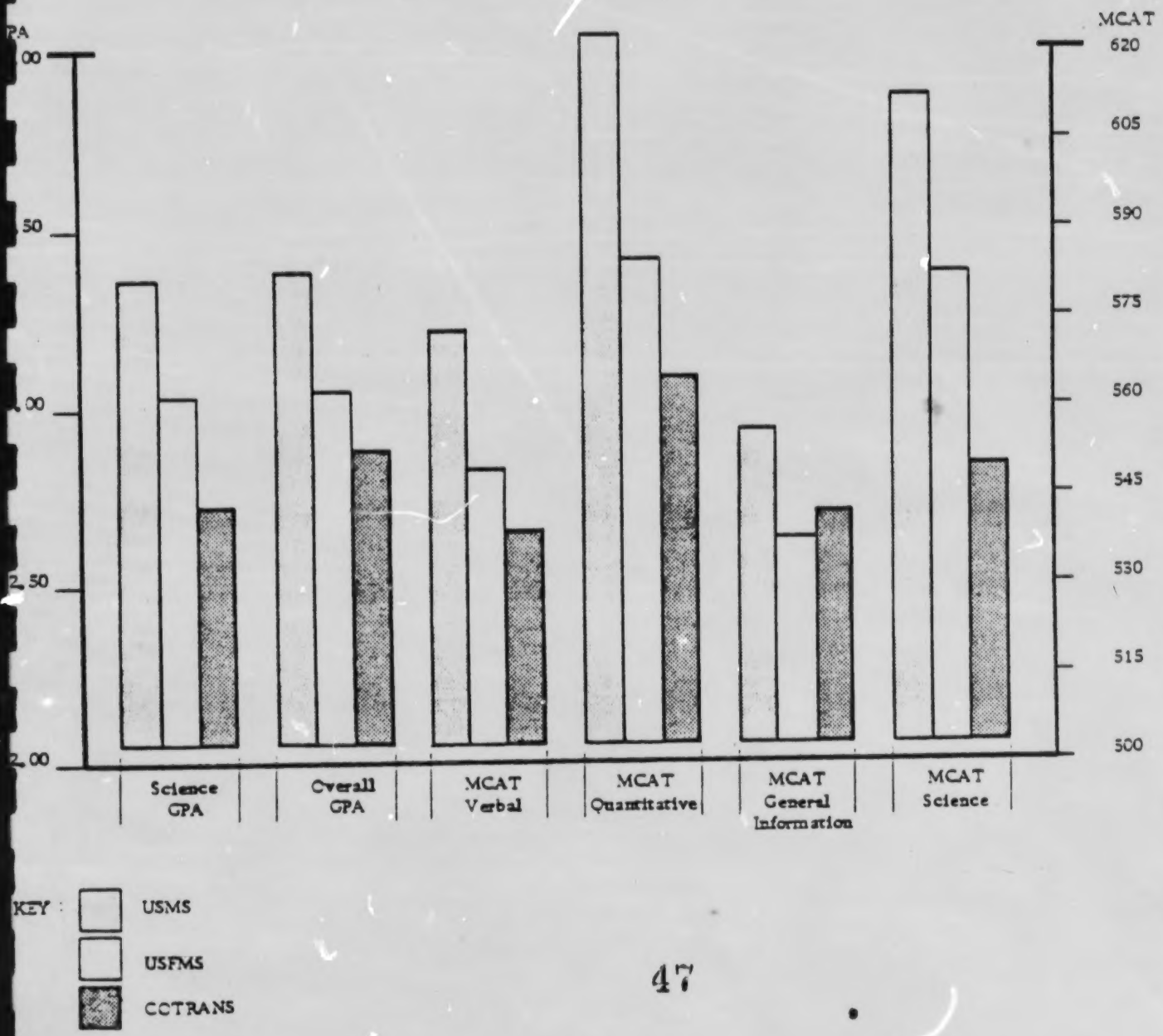
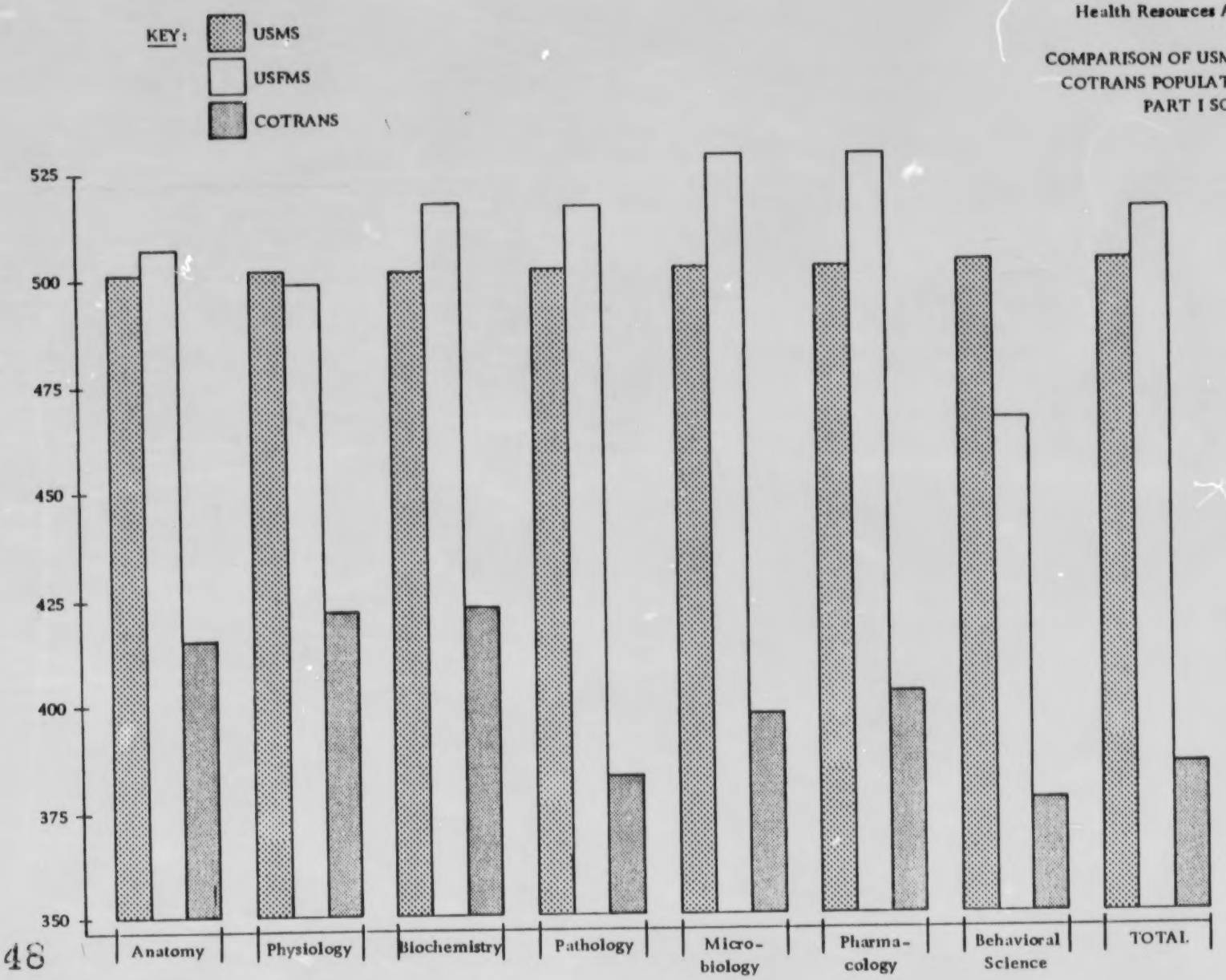


EXHIBIT V

Health Resources Administration

COMPARISON OF USMS, USFMS, AND COTRANS POPULATIONS ON NBME PART I SCORES



NBME Part I

three populations. Exhibits IV and V, following Exhibit III, present the same date pictorially and the resolution of issues posed above becomes evident. The undergraduate GPAs and MCAT scores of USMS are consistently higher than those of USFMS. The differences are even greater when the COTRANS population is compared to the USMS population.

For their part, the USFMS exhibit consistently higher scores than the COTRANS group. Although MCAT score differences were not always statistically significant (a very conservative assumption was made in performing the t-tests), both Science and Overall GPAs were significantly higher for USFMS. Thus it is probable that there were persistent differences in the academic aptitude of USFMS and COTRANS students. Therefore, in addressing the objective of identifying foreign medical school deficiencies via USFMS performance, we must be aware that this group is biased in the direction of superior capabilities compared to the typical U.S. student admitted to a foreign medical school.

Exhibit V, depicts the performance of the three populations on the NBME Part I examination. We might expect that the USFMS would exhibit reasonably high scores, since most U.S. medical school grantees required NBME I passage as a prerequisite for admission. And in fact, the USFMS test means were equal to or significantly higher than the USMS test means in all subareas except Behavioral Science. Accordingly, from a sampling point of reference, the NBME scores of the USFMS subgroup in this study do not suggest deficiencies in their foreign medical education. Also, the fact that the more representative COTRANS population scored significantly lower than both USMS and USFMS students on all subareas cannot necessarily be attributed to their foreign medical school experience. As indicated above, the COTRANS population was inferior on premedical performance measures and thus their subsequent inferior performance on the NBME I examination may be an indication of lesser ability rather than deficient foreign medical education.

This cursory look at premedical and pre third-year performance measures allows us to make two somewhat equivocal observations:

- The subset of students who are admitted to foreign medical schools and then successfully transfer to U.S. schools are not inferior to USMS on basic science performance measures.

- The majority of U.S. students who study in foreign medical schools (as represented by the COTRANS populations) do exhibit poorer performance on basic science examinations than USMS but this cannot necessarily be attributed to their foreign medical

education because of premedical performance differences.

The above findings indicate that it is difficult to document deficiencies in USFMS student performance through NBME Part I scores. They also point to the difficulty of attributing student deficiencies to characteristics of foreign medical education. Fortunately, other measures can be used to assess deficiencies in the foreign medical education of the USFMS. These findings are presented in the succeeding sections.

3. DISTRIBUTION OF USFMS BY FOREIGN MEDICAL SCHOOL AND BY COUNTRY

Material for this report was submitted by 18 of the 19 Section 782 grantees. In combination, they attempted to remedy the deficiencies of 262 USFMS. Seventeen of these grantees conducted courses for Category II students who had already been admitted to U.S. medical schools with advanced standing; one school--Columbia--offered a course of remediation in the basic sciences for Category I students who had yet to pass the NBME I examination.

The comprehensive database developed for this report includes information on 203 students.[6] Exhibit VI, following this page, presents the distribution of USFMS by foreign medical school. As shown in the exhibit, the 203 USFMS by foreign medical school. As shown in the exhibit, the 203 USFMS were very unevenly scattered among 36 foreign medical schools. Almost half (101) transferred from Guadalajara; only two other foreign medical schools supplied more than 10 students each--Far Eastern with 16 and Rome with 12. Sixteen of the schools supplied only one student each.

Because of this unevenness, it was generally difficult to identify deficiencies in individual foreign medical schools. In addition, because the students from any given foreign medical school were usually scattered among the Section 782 grantees, they did not supply uniform information on their experiences. For instance, although Far Eastern in the Philippines accounted for 16 students, the students were widely distributed among the grantees; not all grantees required students to submit written comments on their foreign medical experience and, as a result, the anecdotal information available on Far Eastern is limited.

Given these limitations, data were often organized by country of foreign medical school attended. It was most meaningful to compare the European schools, whose 50 USFMS produced considerable anecdotal material as well as a full range

6/ Columbia's 48 students were considered separately, being Category I (not Category II) students; Cornell submitted information on its 11 students in group terms; and one of the grantees did not make a submission.

EXHIBIT VI

Health Resources Administration

DISTRIBUTION OF USFMS
BY SCHOOL AND COUNTRY

MEXICO	
GUADALAJARA	101
MONTERREY	7
XOCHICALCO	6
NORESTE	5
JUAREZ	3
CHICHUAHUA	2
de BAJA CALIFORNIA	1
TAMAULIPAS	1
TOTAL MEXICO	126
ITALY	
ROME	12
PADOVA	4
L'AQUILA	3
CATHOLIC U. OF ROME	2
FLORENCE	2
BOLOGNA	1
GENOA	1
MILAN	1
SASSARI	1
SIENA	1
TOTAL ITALY	28
FRANCE	
CATHOLIC U. OF LILLE	4
NANCY	2
PARIS	2
CLERMONT-FERRAND	1
GRENOBLE	1
LIEGE	1
ST. ETIENNE	1
TOTAL FRANCE	12
BELGIUM	
LOUVAIN	4
BRUSSELS	3
ANTWERP	2
LEUVEN	1
TOTAL BELGIUM	10
PHILIPPINES	
FAR EASTERN	16
ST. TOMAS	4
U of the EAST	1
TOTAL PHILIPPINES	21
DOMINICAN REPUBLIC	
CENTRAL del ESTE	2
PEDRO HENRIQUEZ URENA	1
TOTAL DOMINICAN REPUBLIC	3
GRENADA, W.I.	
ST. GEORGE'S	1
UNITED KINGDOM	
ST. BARTHOLOMEW	1

EXHIBIT VII
Health Resources Administration

FOREIGN MEDICAL SCHOOLS
BY NUMBER OF USFMS ATTENDING

GUADALAJARA	101
FAR EASTERN	16
ROME	12
MONTERREY	7
XOCHICALCO	6
NORESTE	5
CATHOLIC U. OF LILLE	4
LOUVAIN	4
PADOVA	4
ST. TOMAS	4
BRUSSELS	3
JUAREZ	3
L'AQUILA	3
ANTWERP	2
CATHOLIC U. OF ROME	2
CENTRAL DEL ESTE	2
CHIHUAHUA	2
FLORENCE	2
NANCY	2
PARIS	2
BOLOGNA	1
CLERMONT-FERRAND	1
de BAJA CALIFORNIA	1
GENOA	1
GRENOBLE	1
LEUVEN	1
LIEGE	1
MILAN	1
PEDRO HENRIQUEZ URENA	1
SASSARI	1
SIENA	1
ST. BARTHOLOMEW	1
ST. ETIENNE	1
ST. GEORGE'S	1
TAMAULIPAS	1
U. of the EAST	1
TOTAL	203

of hard data, with the Mexican schools, which were most heavily represented and most fully discussed. Exhibit VII, following Exhibit VI, presents the distribution of Category II students by country of foreign medical school attended.

4. BASIC SCIENCE DEFICIENCIES

As indicated previously, deficiencies in the basic medical science education of USFMS were analyzed in three ways:

- Through curricular deficiencies in the foreign medical schools
- Through the anecdotal comments of USFMS regarding basic science courses given by foreign medical schools
- Through USFMS performance on the NBME Part I examination

Our analysis of foreign basic science curricula in conjunction with student and faculty comments revealed some deficiencies in the basic science education provided by foreign schools (though these were far less severe than in clinical skills). For a variety of reasons, these basic science deficiencies are not reflected in student performance on NBME Part I examinations. A discussion of these issues is presented in the following paragraphs.

(1) Basic Science Curriculum Deficiencies

Curricular deficiencies in foreign medical education may be reflected by:

- The absence of a given course in the foreign medical school curriculum, specifically one that is integral to medical education in the U.S.
- The timing of specific courses in the curriculum, i.e., courses may be scheduled later in foreign medical schools than in U.S. schools.
- The extent and depth of coverage; for instance, Mexican schools tend to offer numerous brief courses in sequence rather than in parallel whereas the European schools offer relatively few courses of considerable depth. Thus students coming out of Mexican and European systems might be expected to have differing deficiencies, relating to depth and cohesiveness on the one hand and breadth on the other.
- Quality of instruction; in some cases this may be demonstrably substandard.

An analysis of available student transcripts and foreign curricula suggests that deficiencies in basic science instruction are relatively limited.[7] The transcripts indicate that most USFMS had taken a full schedule of required courses during their foreign medical school education. Exhibit VIII, following this page, documents the generally low frequency of missing basic science courses. It shows that:

- Of the 203 students for whom data were available, less than 2 percent were missing courses in either anatomy, physiology, or biochemistry. Only 6 percent did not take pharmacology; 11 percent were missing microbiology and 14 percent had no record of a pathology course.

- A substantial number (25 percent) of USFMS were missing a behavioral science course.

- The foreign country whose medical schools were associated with the highest total absence rate was Italy (15.5 percent), while the lowest absence rate was associated with the Philippines (3 percent). Thus, the Philippine curricula were most similar to the American as far as course titles and timing were concerned.

The overall course absence rate for the entire population was only 8.8 percent. Considering that more than a third of the missing courses were in one area, behavioral science, we can conclude that basic science deficiencies (as reflected in missing courses) of the foreign medical schools are not substantial. It is important to note that frequently courses are scheduled for subsequent years of study and are "missing" only in the sense of different timing.

Given the small number of USFMS from individual foreign medical schools, it was not possible to draw meaningful conclusions about the sufficiency of their basic science programs. Further, the preceding analysis describes curricular deficiency only as reflected by the absence of courses. Fortunately, additional insight into the quality of foreign basic medical science education was obtained through anecdotal information supplied by grantees. This is presented in the next section.

7/ Appendix B includes fact sheets on 17 foreign schools which were derived from the submission of various grantees (the material from Columbia and Arizona was particularly helpful). Included are fact sheets for: Guadalajara, Chihuahua, Juarez, Monterrey, Noreste, and Xochicalco in Mexico; the Universities of Genoa and Rome as well as Catholic University of Rome in Italy; the Universities of Nancy and Paris, Catholic University of Lille, and the Free Faculty of Medicine of Lille in France; Antwerp, Brussels, and Louvain in Belgium; and Far Eastern in the Philippines.

EXHIBIT VIII

Health Resources Administration

FREQUENCY OF USFMS MISSING COURSES BY FMS

FMS	# USFMS Attending*	ANAT	PHYS	BIOC	PATH	MICR	PHAR	BHV SC	TOTAL
MEXICO									
Guadalajara	87	1	1	3	8	13	1	8	
Monterrey	7				4			3	
Xochiacalco	5	1	1		1		1	5	
Juarez	3							1	
Chihuahua	2							2	
de Baja California	1			1					
Tamaulipas	1	—	—	—	—	—	—	1	—
Subtotal Mexico	109	2	2	4	13	14	2	21	58
% Missing Courses		1.8	1.8	3.7	11.9	12.8	1.8	19.3	7.6%
ITALY									
Rome	12		1		3			9	
Florence	2						2	2	
L'Aquila	2							1	
Padova	2							2	
Bologna	1							1	
C.U. of Rome	1							1	
Genoa	1								
Milan	1							1	
Sassari	1	—	—	—	1	—	1	—	—
Subtotal Italy	23	0	1	0	4	0	3	17	25
% Missing Courses		0.0	4.3	0.0	17.4	0.0	13.0	73.9	15.5%
FRANCE									
C.U. of Lille	3				1	1	1	1	
Nancy	2								
Paris	2							1	
Clermont-Ferrand	1								
Grenoble	1				1				
Liege	1	—	—	—	1	1	1	1	—
Subtotal France	10	0	0	0	3	2	2	3	10
% Missing Courses		0.0	0.0	0.0	30.0	20.0	20.0	30.0	14.3%
BELGIUM									
Louvain	3				1	1			
Brussels	2						1		
Antwerp	1					1			
Leuven	1	—	—	—	—	—	—	—	—
Subtotal Belgium	7	0	0	0	1	2	1	0	4
% Missing Courses		0.0	0.0	0.0	14.3	28.6	14.3	0.0	8.29%
PHILIPPINES									
Far Eastern	11								
St. Tomas	3						1	1	
U. of the East	1	—	—	—	—	—	—	—	—
Subtotal Philippines	15	0	0	0	0	0	1	1	2
% Missing Courses		0.0	0.0	0.0	0.0	0.0	6.7	6.7	1.9%
DOMINICAN REPUBLIC									
Central Del Este	2				1				
P.N. Urena	1	—	—	—	—	—	—	—	—
Subtotal Dominican Republic	3	0	0	0	1	0	0	0	1
% Missing Courses		0.0	0.0	0.0	33.3	0.0	0.0	0.0	4.8%
GRENADA, W.I.									
St. George's	1				1	1	1		3
GRAND TOTAL	168	2	3	4	23	19	10	42	103
% Missing Courses		1.2	1.8	2.4	13.7	11.3	6.0	25.0	8.8%

* Does not include Columbia, Cornell, or Brown students, but does include a number of students for whom course lists were not available, specifically from:

-Guadalajara	(8)	-Siena	(1)	-Antwerp	(1)
-Noreste	(2)	-C.U. of Lille	(1)	-Far Eastern	(3)
-Padova	(2)	-St. Etienne	(1)	-St Bartholomew	(1)

(2) Views On Basic Science Deficiencies Expressed By USFMS

Although they received most of the required basic science courses during their foreign medical school experience, many USFMS had appreciable complaints about the quality of the education. Exhibit IX, following this page, indicates the number of USFMS who complained about various basic science courses. As shown on the exhibit, over 50 percent of the students voiced complaints about one or more courses. Of the 127 students making complaints, the greatest number mentioned anatomy--28 percent. Over 16 percent complained about behavioral science, 14 percent about pathology, and 13 percent about pharmacology.

These data were further analyzed by country of foreign medical school attended, as shown in Exhibit X, following Exhibit IX. The results were fairly consistent across Mexican and European schools: 61 percent of the students from Mexican schools expressed complaints compared with 51 percent of the students from European schools.

Naturally, the numbers and percentages in themselves do not fully reflect the significance of the deficiencies. Appendix C of Volume III presents a detailed summary of actual comments made by students on the strengths and weaknesses of basic science courses as well as related comments on the faculty and facilities of foreign medical schools. In general, the weaknesses in basic science curricula centered on the following:

- Obsolescence and fragmentation of the material presented. This complaint was made most frequently by students from Mexican schools.

- Absence or inadequacy of the laboratory experience associated with basic science courses. Many students from European schools indicated they were not given laboratory opportunities, while some from Mexican schools criticized the content of the laboratory exercises.

- Lack of clinical correlation. Some students from European schools complained about the abstruse nature of the basic science courses presented at their foreign medical schools. They reported that some professors seemed unwilling to make any bridges between the academic and the clinical. Students from Mexican schools made similar comments.

- Some students from Mexican schools also complained about the abbreviated nature of many courses and about the common practice of teaching these courses in somewhat disconnected series.

EXHIBIT IX

Health Resources Administration

FREQUENCY DISTRIBUTION OF DEFICIENCIES IN BASIC SCIENCE INSTRUCTION CITED BY USFMS

Foreign Medical School*	Number of USFMS Attending **	Number of Students Reporting	Number of Students Expressing Complaints: Basic Sciences: Anatomy	Behavioral Science	Biochemistry	Embryology	Epidemiology	Histology	Immunology	Mathematical Sciences	Microbiology	Neuroanatomy	Neurobiology	Pathology	Pathological History	Patho-physiology	Pharmacology	Physiology	Public Health	Basic Sciences in General	Labs in General
Guadalajara	126	71	23	14	7	4	1	7	--	--	3	3	--	9	--	--	7	10	--	3	--
Noreste	15	12	4	2	2	1	--	3	--	--	5	3	3	3	--	--	2	--	--	--	4
Juarez	10	6	1	1	1	--	--	--	--	--	--	--	--	--	--	--	1	1	--	--	3
Monterrey	7	5	1	--	--	--	--	--	--	--	--	--	--	2	--	--	2	--	1	--	--
Xochicalco	6	5	1	1	--	--	--	--	--	--	1	--	--	1	--	1	--	--	--	2	--
Chihuahua	2	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--
NPI	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Nuevo Leon	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tamaulipas	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Mexico	169	104	31	18	10	5	1	10	--	--	9	6	3	15	--	1	13	11	1	5	8
Rome	18	6	1	--	1	--	--	--	1	--	--	--	--	--	--	--	--	1	--	--	2
Padova	4	3	--	1	1	1	--	--	--	--	--	--	--	--	1	--	1	--	--	--	2
Florence	3	2	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1	--	--	--	2
Bologna	1	1	--	--	1	--	--	--	1	--	1	--	--	--	--	--	--	--	--	--	1
Siena	1	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	1
Total Italy	27	13	1	1	3	1	--	--	2	1	1	--	--	1	1	--	2	1	--	--	8
Cu Lille	4	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2
Grenoble	1	1	--	1	--	--	--	--	--	--	--	--	--	1	--	--	1	--	--	--	1
Total France	5	3	--	1	--	--	--	--	--	--	--	--	--	1	--	--	1	--	--	--	3
Brussels (Belgium)	3	2	1	--	--	--	--	--	--	--	--	1	--	1	--	--	1	--	--	--	--
Far Eastern	18	3	2	1	--	1	--	--	--	--	2	--	1	--	--	--	1	--	--	--	--
Santo Tomas	4	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1
Total Phillippines	22	5	2	1	--	1	--	--	--	--	2	--	1	--	--	--	1	--	--	1	1
GRAND TOTAL	226	127	35	21	13	7	1	10	2	1	12	7	4	18	1	2	17	12	1	6	20

Notes: *Includes only schools cited for their basic science deficiencies.
**Includes Columbia (Category I) students and Cornell students, two groups in the overall database.

EXHIBIT X

Health Resources Administration

FREQUENCY DISTRIBUTION OF DEFICIENCIES IN BASIC SCIENCE INSTRUCTION CITED BY MEXICAN AND EUROPEAN USPMS

	Number of Students Expressing Complaints																		
	Basic Sciences																		
	Anatomy	Behavioral Science	Biochemistry	Embryology	Epidemiology	Histology	Immunology	Mathematical Sciences	Microbiology	Neuroanatomy	Neurobiology	Pathology	Pathological History	Pathophysiology	Pharmacology	Physiology	Public Health	Basic Science Overall	Laboratory Experience
MEXICAN SCHOOLS*																			
Number Attending** 168 Number of Informants 103																			
Number Citing Deficiencies	31	18	10	5	1	10	--	--	9	6	3	15	--	1	13	11	1	5	8
Percent of Informants Citing Deficiencies	30.1	17.5	9.7	4.9	.97	9.7	--	--	8.7	5.8	2.9	14.6	--	.97	12.6	10.7	.97	4.9	7.8
EUROPEAN SCHOOLS*																			
Number Attending** 35 Number of Informants 18																			
Number Citing Deficiencies	2	2	3	1	--	--	2	1	1	1	--	3	1	--	4	1	--	--	11
Percent of Informants Citing Deficiencies	11.1	11.1	16.7	5.6	--	--	11.1	5.6	5.6	5.6	--	16.7	5.6	--	22.2	5.6	--	--	61.0

Notes: *Includes only schools with reported basic science deficiencies.
**Includes Columbia (Category I) students and Cornell students, two groups not represented in the overall database.

(3) USFMS Performance On NBME Part I Examination

As indicated, the overall NBME I mean score of USFMS was 509 while the same mean for USMS was 500. The table below compares means for the individual subject areas:

	USFMS	National USMS Population
Anatomy	504	500
Physiology	496	500
Biochemistry	516	500
Pathology	509	500
Microbiology	524	500
Pharmacology	523	500
Behavioral Science	469	500

The absence of deficiencey on the NBME examination is consistent with the relatively low frequency of documentable curricular deficiencies (see Exhibit VIII, following page 27). However, when NBME Part I performance is related to the absence of certain basic science courses we do see a pattern of depressed scores.

Exhibit XI, following this page, compares the mean Part I scores by subarea for students who completed and students who did not take courses in the seven basic science subareas. In each subarea except pharmacology, students who did not take the relevant course had lower mean Part I scores than students who did. The differences are small and we would expect this from the "basement effect" of the admissions filtering process (i.e., all students had to at least pass each subarea). Even so, there are two areas in which the differences are statistically significant (anatomy and microbiology).

It is not surprising that students who did not take a course in a subject area did not perform as well on a subsequent examination as students who did. The unanswered question is whether this relationship would be even more pronounced if the broader and more representative COTRANS population were considered instead of the selected USFMS group examined in this study.

Anecdotal information obtained from grantees during the course of this study suggests that generalizations might be made about the quality of education by foreign medical school and country. If the quality of education differs substantially from school to school, we would expect to find differences in basic science scores in the NBME I examination. Exhibit XII, following this page, presents the mean NBME scores (as well as other USFMS performance characteristics) by foreign medical school.

EXHIBIT XI

Health Resources Administration

COMPARISON OF MEAN NBME PART I SCORES
BY ABSENCE AND PRESENCE OF COURSE

	ANAT	PHYS	BIOC	PATH	MICR	PHAR	BHV SC
Course Taken:							
$\bar{X}$	499	490	512	510	526	518	472
S.D.	78.7	64.7	75.6	83.7	69.5	70.6	89.1
N	158	157	157	140	141	143	115
Course Absent:							
$\bar{X}$	423	453	450	494	487	534	457
S.D.	10.6	50.1	157.4	76.2	55.4	73.8	87.1
N	2	3	3	17	16	14	36

EXHIBIT XII(1)

Health Resources Administration

USPHS PERFORMANCE CHARACTERISTICS BY FOREIGN MEDICAL SCHOOL

Foreign Medical School	N	Mean (Standard Deviation) SGPA	OGPA	VMCAT	QMCAT	GMCAT	SMCAT	ANAT NBME	PHYS NBME	BIOC NBME	PATH NBME	MICR NBME	PHAR NBME	BHV SC NBME	Total NBME
Tamaulipas	1	2.40 (0)	2.60 (0)	615 (0)	655 (0)	535 (0)	735 (0)	475 (0)	445 (0)	530 (0)	440 (0)	520 (0)	545 (0)	525 (0)	495 (0)
Padova	4	3.36 (.156)	3.27 (.278)	615 (90.6)	600 (52.0)	560 (64.6)	627 (38.8)	512 (122.9)	588 (75.9)	572 (171.6)	515 (43.3)	580 (106.4)	573 (75.9)	483 (93.0)	557 (106.1)
Grenoble	1	2.70 (0)	2.85 (0)	515 (0)	635 (0)	565 (0)	645 (0)	445 (0)	525 (0)	400 (0)	440 (0)	535 (0)	425 (0)	385 (0)	440 (0)
Rome	12	3.17 (.314)	3.18 (.263)	560 (64.7)	600 (78.6)	539 (48.8)	612 (71.2)	536 (62.7)	498 (65.3)	528 (69.9)	509 (65.9)	559 (79.7)	530 (70.8)	465 (85.1)	523 (64.9)
Monterrey	7	3.00 (.342)	2.95 (.302)	559 (93.6)	585 (48.6)	529 (109.7)	591 (55.3)	538 (76.1)	512 (94.3)	514 (105.9)	498 (74.7)	516 (69.0)	496 (82.8)	471 (139.6)	514 (88.5)
Catholic University of Lille	4	3.14 (.059)	3.43 (.269)	537 (106.8)	527 (31.8)	587 (37.5)	568 (40.4)	475 (0)	495 (0)	535 (0)	430 (0)	425 (0)	525 (0)	395 (0)	470 (0)
Guadalajara	101	2.93 (.378)	2.96 (.405)	551 (82.0)	563 (88.1)	536 (80.2)	565 (70.5)	492 (81.1)	489 (55.5)	507 (72.3)	510 (83.9)	518 (73.9)	531 (68.2)	477 (84.6)	507 (61.7)
University of the East	1			495 (0)	465 (0)	515 (0)	455 (0)	515 (0)	525 (0)	470 (0)	550 (0)	510 (0)	535 (0)	450 (0)	510 (0)
Clermont-Ferrand	1			485 (0)	595 (0)	495 (0)	495 (0)	490 (0)	465 (0)	495 (0)	440 (0)	560 (0)	500 (0)	465 (0)	485 (0)
Central Del Este	2	2.82 (0)	2.77 (0)	510 (106.1)	620 (7.1)	660 (35.4)	570 (91.9)	640 (0)	670 (0)	590 (0)	635 (0)	605 (0)	595 (0)	355 (0)	615 (0)
Louvain	4	2.95 (.586)	3.02 (.214)	610 (42.0)	608 (85.4)	580 (103.4)	640 (71.9)	558 (111.5)	524 (125.0)	573 (80.9)	526 (83.7)	540 (95.4)	514 (106.6)	510 (98.2)	543 (110.9)
Catholic University of Rome	2	3.22 (.014)	3.19 (.085)	490 (49.5)	600 (7.1)	585 (0)	545 (99.0)	438 (3.5)	503 (24.7)	520 (106.1)	420 (28.3)	515 (63.6)	548 (95.5)	460 (134.4)	485 (77.8)
Far Eastern	16	3.20 (.484)	3.21 (.415)	563 (68.0)	652 (54.9)	559 (82.2)	624 (40.0)	530 (58.2)	499 (77.1)	507 (63.0)	562 (64.1)	543 (48.5)	512 (62.2)	458 (82.7)	507 (48.4)

EXHIBIT XII(2)

Foreign Medical School	N	Mean (Standard Deviation) SGPA	OGPA	VMCAT	QMCAT	GMCAT	SMCAT	ANAT NBME	PHYS NBME	BIOC NBME	PATH NBME	MICR NBME	PHAR NBME	BHV SC NBME	Total NBME
Leuven	1	2.31 (0)	2.77 (0)	575 (0)	475 (0)	595 (0)	525 (0)	420 (0)	490 (0)	585 (0)	465 (0)	490 (0)	455 (0)	385 (0)	480 (0)
Noreste	5	3.04 (.236)	2.91 (.316)	520 (91.1)	620 (107.2)	477 (40.3)	562 (69.4)	507 (32.2)	480 (75.3)	547 (81.7)	551 (30.3)	471 (43.8)	535 (59.5)	476 (60.8)	513 (40.2)
Xochicalco	6	2.87 (.316)	3.06 (.281)	450 (33.1)	552 (78.9)	512 (39.4)	572 (95.3)	491 (75.2)	475 (95.4)	469 (38.6)	454 (70.2)	488 (52.8)	455 (50.9)	401 (68.0)	448 (38.1)
Pedro Henriquez Urena	1	2.95 (0)	2.82 (0)	505 (0)	615 (0)	495 (0)	645 (0)	335 (0)	440 (0)	405 (0)	485 (0)	420 (0)	420 (0)	390 (0)	400 (0)
Florence	2	3.08 (.184)	3.12 (.177)	575 (0)	620 (7.0)	555 (70.7)	625 (0)	547 (95.4)	457 (130.8)	530 (42.4)	480 (193.8)	590 (14.1)	592 (152.0)	410 (0)	525 (106.0)
University de Baja California	1		2.93 (0)					405 (0)	395 (0)	430 (0)	420 (0)	370 (0)	395 (0)	560 (0)	405 (0)
Juarez	3	2.78 (.446)	2.54 (.606)	600 (49.4)	650 (35.3)	590 (77.7)	735 (14.1)	488 (102.7)	546 (127.7)	605 (113.0)	506 (67.5)	583 (68.0)	583 (5.7)	570 (123.7)	566 (80.8)
St. George's	1	3.09 (0)	2.97 (0)	665 (0)	645 (0)	545 (0)	505 (0)	470 (0)	330 (0)	465 (0)				430 (0)	
L'Aquila	3	2.71 (1.110)	2.96 (.615)	475 (36.0)	565 (96.4)	498 (73.7)	485 (10.0)	503 (184.5)	515 (40.9)	528 (127.4)	521 (88.3)	485 (75.4)	561 (70.0)	375 (40.9)	505 (77.9)
Paris	2	2.88 (.035)	2.77 (.587)	665 (14.1)	675 (42.4)	590 (63.6)	610 (7.0)	577 (10.6)	532 (60.1)	617 (60.1)	562 (67.1)	600 (0)	517 (10.6)	455 (141.4)	567 (31.8)
Nancy	2	2.56 (0)	2.76 (.361)	485 (0)	525 (0)	495 (0)	455 (0)	432 (123.7)	480 (42.4)	552 (81.3)	450 (21.2)	507 (17.6)	567 (81.3)	435 (120.2)	492 (17.6)
Brussels	3	3.19 (.365)	3.26 (.262)	535 (96.4)	571 (136.5)	511 (120.5)	571 (101.1)	528 (102.4)	471 (29.2)	486 (109.1)	543 (50.0)	473 (45.3)	486 (95.0)	428 (110.1)	486 (78.4)
Chihauhua	2	3.10 (.149)	3.20 (.368)	405 (0)	475 (0)	415 (0)	545 (0)	527 (130.8)	447 (67.1)	497 (53.0)	452 (81.3)	472 (31.8)	475 (127.2)	360 (113.1)	457 (67.1)
Antwerp	2		2.80 (.347)	495 (0)	495 (0)	475 (0)	535 (0)	490 (28.2)	550 (127.2)	492 (81.3)	455 (56.5)	457 (17.6)	515 (49.4)	382 (144.9)	480 (77.7)
Liege	1	3.20 (0)	3.10 (0)	595 (0)	645 (0)	605 (0)	675 (0)								

EXHIBIT XII(3)

		Mean (Standard Deviation)													
Foreign Medical School	N	SGPA	OGPA	VMCAT	QMCAT	GMCAT	SMCAT	ANAT NBME	PHYS NBME	BIOC NBME	PATH NBME	MICR NBME	PHAR NBME	BHV SC NBME	Total NBME
Genoa	1	3.15 (0)	3.22 (0)	545 (0)	665 (0)	625 (0)	665 (0)	455 (0)	430 (0)	565 (0)	325 (0)	480 (0)	455 (0)	430 (0)	440 (0)
St. Tomas	4	3.24 (.480)	3.37 (.152)	495 (0)	575 (0)	565 (0)	634 (0)	520 (78.1)	455 (47.6)	540 (20.0)	486 (157.6)	613 (41.9)	510 (61.4)	546 (71.8)	533 (60.2)
Milan	1	3.30 (0)	3.20 (0)	610 (0)	630 (0)	455 (0)	625 (0)								
Siena	1	3.60 (0)	3.40 (0)	580 (0)	520 (0)	560 (0)	500 (0)								
Sassari	1	3.72 (0)	3.37 (0)	445 (0)	575 (0)	495 (0)	555 (0)	710 (0)	565 (0)	605 (0)	590 (0)	510 (0)	610 (0)	475 (0)	605 (0)
Bologna	1	3.57 (0)	3.42 (0)	605 (0)	555 (0)	555 (0)	615 (0)	480 (0)	550 (0)	595 (0)	565 (0)	640 (0)	445 (0)	630 (0)	565 (0)
St. Bartholomew	1							685 (0)	665 (0)	695 (0)	525 (0)	630 (0)	560 (0)	640 (0)	650 (0)
St. Etienne	1	2.50 (0)	2.52 (0)	415 (0)	585 (0)	425 (0)	535 (0)	470 (0)	640 (0)	550 (0)	495 (0)	580 (0)	550 (0)	385 (0)	505 (0)
	202														

The variation in scores is great. This is due primarily to the large number of schools that are represented by only a few individuals. For example, the lowest (400) and the highest (650) mean Total NBME scores are each based on one student, but little can be concluded about a school that has fewer than seven students. The four schools with seven or more students (Guadalajara, Far Eastern, Rome, and Monterrey) all have remarkably close mean NBME I scores. Their respective mean Total NBME scores are 507, 507, 523, and 514. The subarea scores are also clustered. It is interesting that while the performance measures after two years of medical education are quite smiliar among these four schools, the premedical characteristics are variable. The mean Science GPA ranges from 2.93 at Guadalajara to 3.20 at Far Eastern, a significant difference ($t_{(115)} = 2.13$, $p < .05$). The mean Science MCAT ranges from 565 at Guadalajara to 624 at Far Eastern, also a significant difference ($t_{(115)} = 4.73$, $p < .01$). Thus, the similarity in NBME scores across foreign medical schools cannot be attributed to similar premedical backgrounds.

It may be more useful to examine differences in student performance among the countries in which the medical schools are located. Exhibit XIII, following this page, presents student performance characteristics by country. Again, the range of mean Total NBME scores is restricted, 499 for France to 528 for Italy, while the premedical measures are variable. The difference between the mean Science GPAs for France (2.87) and Italy (3.21) is significant ($t_{(38)} = 3.08$, $p < .01$). The Science MCAT range is also large, 562 for France and 616 for Philippines ($t_{(30)} = 2.41$, $p < .05$).

When the mean rank order for the NBME scores is computed (by rank ordering the countries for each of the eight NBME scores and calculating the mean rank position), the following order prevails:

o Italy	1
o Philippines	2
o Mexico	3
o Dominican Republic--Belgium tied	4
o France	5

This is not consistent with the common view that European schools are generally superior to Mexican schools. On the other hand, when the mean rank order is computed for the six premedical variables, we get a different result:

o Philippines	1
o Belgium	2
o Italy	3
o Dominican Republic	4
o France	5
o Mexico	6

EXHIBIT XIII

Health Resources Administration

USFMS PERFORMANCE CHARACTERISTICS BY FMS COUNTRY

MEAN
(Standard Deviation)

FOREIGN MEDICAL SCHOOL COUNTRY	Number of USFMS*	SGPA	OGPA	VMCAT	QMCAT	GMCAT	SMCAT	ANAT	PHYS	BIOC	PATH	MICR	PHAR	BHV SC	Total
BELGIUM	11	2.94 (.491)	3.03 (.271)	567 (72.8)	576 (97.0)	553 (94.1)	601 (81.8)	521 (92.3)	510 (90.4)	532 (87.4)	511 (68.1)	499 (69.9)	500 (80.6)	448 (107.1)	507 (84.1)
DOMINICAN REPUBLIC	3	2.89 (.092)	2.80 (.035)	508 (75.1)	618 (5.8)	605 (98.5)	595 (78.1)	488 (215.7)	555 (162.6)	498 (130.8)	560 (106.1)	513 (130.8)	508 (123.7)	373 (24.7)	508 (152.0)
FRANCE	11	2.87 (.266)	2.97 (.454)	538 (97.8)	586 (67.4)	547 (67.0)	562 (62.8)	486 (70.8)	516 (58.6)	539 (74.4)	473 (59.6)	527 (67.5)	522 (52.0)	426 (77.6)	499 (45.0)
ITALY	29	3.21 (.383)	3.20 (.253)	557 (73.6)	595 (63.4)	542 (55.9)	592 (71.2)	530 (97.3)	516 (74.8)	546 (88.4)	501 (80.5)	553 (77.7)	542 (74.4)	467 (92.9)	528 (73.8)
MEXICO	126	2.93 (.363)	2.95 (.395)	547 (83.6)	568 (80.3)	533 (80.3)	572 (74.0)	495 (79.6)	489 (63.0)	509 (75.2)	506 (81.2)	515 (72.8)	525 (70.6)	474 (90.6)	505 (63.8)
PHILIPPINES	21	3.21 (.468)	3.24 (.380)	556 (67.6)	637 (69.6)	557 (78.0)	616 (55.0)	528 (57.8)	494 (71.9)	511 (57.9)	549 (83.2)	554 (53.2)	513 (58.7)	473 (83.7)	513 (48.1)
Total Population	201	2.99 (.394)	3.01 (.383)	550 (79.9)	582 (83.1)	539 (77.0)	581 (72.3)	504 (82.8)	497 (68.8)	517 (80.0)	509 (80.3)	524 (72.7)	523 (72.2)	468 (90.5)	503 (65.8)

This order suggests that European and Philippine schools are more selective than Mexican schools in admitting USFMS.

Up to this point, we have examined the Category II students only (i.e., students who had sucessfully transferred to a U.S. medical school). One grantee, Columbia, dealt exclusively with Category I students. Because most Category I students had not taken the NBME Part I examination by the time they entered the remedial program, Columbia administered a "shelf" copy of the examination (a previously used instrument supplied by the NBME) under the same conditions as the regular test.

Exhibit XIV, following this page, presents the premedical and NBME performance data by foreign medical school attended and country for the 48 Category I students. As indicated on the exhibit:

- A comparison of Science GPA and Overall GPA between Category I and Category II students reveals no significant difference ($t_{(353)} = 1.01$ and $t_{(253)} = 1.18$, $p > .10$, respectively).

- The Verbal, General Information, and Science MCAT scores are significantly lower for Category I students than for Category II students ($t_{(253)} = 1.237$, $p < .05$; $t_{(253)} = 1.84$, $p < .10$; and $t_{(253)} = 3.17$, $p < .05$, respectively). This suggests that the Category I students lie somewhere between the USFMS Category II group and the COTRANS group at the time of graduation from undergraduate school.

- With respect to the NBME "shelf" test, the Category I students' performance was consistently worse than that of the Category II USFMS and USMS (all differences are significant at the .05 level). Thus the Category I students, prior to the remedial course, appear to be more representative of the COTRANS population even though there was a certain amount of selectivity when they were admitted to the Columbia remedial program.

It is important to note that after the Columbia review course was administered, 37 of the Category I students took the official June 1978 NBME I examination. In six of the seven subject areas, mean scores on the post-course examination were significantly better than on the pretest. The mean scores on the posttest were much closer to those of the Category II students and the USMS. This suggests that the initial inferior performance of the Category I students, who are more representative of the COTRANS population, was not due to lack of ability, but rather to lack of experience. Whether this experience was missing because of deficiencies in their foreign medical education can only be surmised from this study.

EXHIBIT XIV

Health Resources Administration

PERFORMANCE CHARACTERISTICS BY FMS AND COUNTRY
FOR CATEGORY I STUDENTS

Foreign Medical School	Number	SGPA	OGPA	VMCAT	QMCAT	GMCAT	SMCAT	ANAT	PHYS	BIOC	PATH	MICR	PHAR	BHV SC	TOTAL
Rome	4	3.05	3.29	608	593	535	600	494	435	445	411	421	468	446	436
		(.261)	(.147)	(56.2)	(81.8)	(66.8)	(65.6)	(122.0)	(101.7)	(119.8)	(103.6)	(109.3)	(131.1)	(174.7)	(132.3)
Guadalajara	25	2.90	3.05	503	550	519	533	424	397	388	394	347	436	423	377
		(.432)	(.326)	(95.0)	(71.2)	(73.8)	(72.3)	(145.0)	(148.0)	(143.6)	(120.1)	(123.8)	(127.2)	(122.9)	(148.8)
Florence	1	3.50	3.59	485	675	535	595	625	540	515	430	495	545	420	520
		(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Catholic University of Rome	1	3.05	3.20	595	645	635	625	525	520	535	445	395	460	505	486
		(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Far Eastern	1	3.28	3.23	495	635	515	615	275	300	265	365	300	340	225	250
		(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Noreste	9	2.89	2.99	503	610	495	548	346	375	396	311	334	435	354	333
		(.314)	(.295)	(74.4)	(71.7)	(80.2)	(36.3)	(122.8)	(135.5)	(91.8)	(157.3)	(88.9)	(162.1)	(120.3)	(144.0)
Juarez	7	2.94	3.06	536	536	502	509	244	338	310	341	358	360	396	292
		(.299)	(.302)	(105.7)	(90.3)	(82.8)	(123.7)	(102.3)	(134.3)	(144.3)	(145.1)	(114.9)	(142.2)	(139.6)	(149.8)
Instituto Politecno Nacional	1	2.60	2.80	--	--	--	--	210	240	265	180	175	255	145	140
		(0)	(0)					(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Nuevo Leon	1	2.59	2.81	565	535	545	545	460	330	210	300	235	255	255	240
		(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Country															
Italy	7	3.05	3.25	585	615	552	603	476	434	442	386	393	447	408	412
		(.319)	(.256)	(65.7)	(72.9)	(65.9)	(51.9)	(153.4)	(120.6)	(121.4)	(117.3)	(127.1)	(129.0)	(171.3)	(155.5)
Mexico	42	2.90	3.03	510	559	514	532	378	381	372	365	344	419	400	350
		(.379)	(.307)	(91.1)	(76.4)	(77.2)	(76.2)	(146.8)	(140.0)	(135.4)	(133.0)	(113.1)	(138.0)	(125.8)	(147.2)
Philippines	1	3.28	3.23	495	635	515	615	275	300	265	365	300	340	225	250
		(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Total	50	2.93	3.07	519	568	519	543	390	387	380	368	350	421	397	357
		(.372)	(.306)	(90.3)	(77.4)	(75.4)	(76.8)	(150.0)	(136.7)	(134.2)	(128.6)	(114.2)	(134.9)	(132.1)	(147.6)

5. CLINICAL SKILLS DEFICIENCIES

Foreign medical education in the clinical area was also assessed in three ways, but these differed somewhat from the three approaches used to measure basic science deficiencies. Specifically, clinical deficiencies were assessed:

- Through a comparative analysis of selected curricula. (Given language barriers as well as great variety in the titles of clinical courses, we felt that the transcript analysis used for documenting basic science course absences would not be reliable for clinical courses. Instead, selected case comparisons were made between two types of foreign medical school curricula and a typical U.S. curriculum.)

- Through the anecdotal comments made by USFMS

- Through USFMS performance data. (Since there is no clinical component to the NBME Part I examination, individual grantee assessments of USFMS clinical skills were used, when available. Such assessments were made through a broad array of tests, which varied extensively by grantee.)

(1) Curriculum Deficiencies

Prior to the remedial programs, the grantees expected that most USFMS would be very deficient in clinical skills--patient history taking, patient interviewing, physical examination/diagnosis, psychiatric assessment, patient write-ups, case presentation, and so forth. They based their prejudgements on prior experience with USFMS and, where possible, on an examination of foreign medical school curricula. Collectively, the grantees were able to develop reasonably complete descriptions of the curricula of 17 foreign medical schools (these are presented in Appendix B of this report.) A comparative analysis of these curricula suggests two broad classifications:

- A typical Mexican medical school curriculum
- A typical European medical school curriculum

Accordingly, to explore the deficiencies in clinical training that may arise from discrepancies between U.S. and foreign curricula, we will compare the program of an American school with the programs of two foreign medical schools. Exhibit XV, following this page, compares the curricula of the Universities of Iowa, Rome, and Guadalajara, demonstrating extensive differences among them. More specifically:

EXHIBIT XV

Health Resources Administration
COMPARISON OF MEDICAL SCHOOL CURRICULA

University of Iowa	University of Rome	Guadalajara	
		1. Semester I (18 Weeks)	Semester II (18 Weeks)
1. First Academic Period (32 Weeks)	1. First Year		
Required			
Biochemistry	General Biology	Anatomy	Physiology
Gross Human Anatomy	Zoology	Histology	Biochemistry
Microanatomy	Chemistry	Embryology	Humanistic Medicine
Physiology	Psychology	Neuroanatomy	Preventive Medicine
General Pathology	Physics	Introduction to Medical Practice	Medicine in the Community
Microbiology	Anatomy	Medical Ethics	
Endocrinology	Histology	History of Mexico	
Biostatistics	Embryology	Geography and Economy of Mexico	
Human Dimensions in Medicine		Basic Mexican Constitutional Law	
		Medicine in the Community (Guardia)	
Elective			
Basic Emergency Skills			
Principles of Family Medicine			
2. Second Academic Period (32 Weeks)	2. Second Year	2. Semester III (18 Weeks)	Semester IV (18 Weeks)
Required			
Systemic Pathology	Anatomy	Pharmacology	Pathology
Pharmacology	Histology/Embryology	Human Ecology	Mesology or Pathophysiology
Neurobiology and Behavior	Microbiology	Microbiology	Medical Documentation
Introduction to Clinical Medicine	Biochemistry	Parasitology	Introduction to Clinic
Community Health	Human Physiology	Medical Psychology	Medicine in the Community
	General Pathology	Public Health	
		Medicine in the Community	
		Surgical Education and Technique	
Elective			
Nutrition			
Introduction to Medical Genetics			
Humanistic Medicine			
Principles of Family Medicine			
Spanish for Health Professionals			
3. Third Academic Period	3. Third Year*	3. Semester V (18 Weeks)	
Required Clerkships			
Internal Medicine	Human Physiology	Cardiology	
Surgery	General Pathology	Angiology	
Pediatrics		Pneumatology	
Obstetrics/Gynecology		Ophthalmology	
Psychiatry		ENT	
Urology		Externanipe in U.S.	
Anesthesia			
Orthopedics			
Otolaryngology			
Dermatology			
Preceptorships			
4. Fourth Academic Period	4. Fourth Year		
Electives for minimum of 32 credit hours (1 week clinical work = 1 credit hour)	Pharmacology Pathology Medical Pathology Surgical Pathology Anatomical Pathology		
	5/6. Fifth & Sixth Years		
	Pediatrics Medicine Obstetrics/Gynecology Medical Pathology Surgical Pathology Anatomical Pathology		

* Physical diagnosis may be taken as early as the third year but is not a required course.

- Like many American medical schools, the University of Iowa requires its students to carry a very heavy load of basic sciences in the first year and one-half; clinical instruction is then introduced intensely in the second half of the sophomore year. Serving as a fourth semester bridge between the basic science and clinical portions of the curriculum, Iowa's "Introduction to Clinical Medicine" is a 20 semester-hour course in which students spend from 30 to 36 hours a week in scheduled learning activities. The preceptoral system used in this course allows for continuous monitoring, evaluation, and remediation of skills. The third year, which is entirely clinical, involves required clerkships in 12 major specialities during which students are observed and supervised on a daily basis. The fourth year, also clinical, is entirely elective.

- Rome's curriculum diverges sharply from Iowa's. The first year would qualify as a premedical year by most American standards, in which anatomy, histology, and embryology might be introduced. In the second year (the year to which most Americans are admitted when they matriculate), six basic science courses are covered, all of which are introduced in Iowa's first year. Thus, depending on the course, Rome's program follows one, two, or even three years behind Iowa's. For instance, general pathology is not introduced until the third year vs the first year at Iowa. Rome's courses in medical, surgical, and anatomical pathology, which in combination may be considered a rough equivalent to Iowa's "Introduction to Clinical Medicine" (but without the patient contact), are not offered until the fourth year. In sum, as a result of its limited and protracted offerings in the basic sciences, Rome delays the student's exposure to patients until the fifth year. For this reason, students transferring from Rome, and from most other European schools, can be expected to have had no formal training in clinical medicine unless they have completed the fourth or fifth years of the foreign curriculum.

- Guadalajara does not demonstrate as clear a case of deficiency in clinical training. Its "Introduction to Medical Practice," reportedly a 40-hour course providing instruction in emergency assessment and care skills, is offered in the first semester. In the fourth semester, students take the "Introduction to Clinical Medicine" course, which reportedly consists of: (1) 51 hours of lectures on the natural history of disease, doctor-patient relationship, and mechanisms of disease; (2) 80

hours of small group conferences wherein diagnosis, causes, sequelae, related syndromes, pertinent historical data, appropriate lab tests and interpretation, assessment, and plan are discussed and a physical examination of the organ system under study is performed; and (3) 76 hours of mini-group practical sessions are offered, with eight or so students per group required to perform a complete history, physical, and problem-oriented write-up on six patients. Also during the fourth semester, students take a 38-hour course in medical documentation, reportedly covering statistics, library science, and problem-oriented medical write-ups. Moreover, as one grantee noted, at the outset of training and during each semester, an effort is made to expose the student to "medicine in the community"; during this community medicine or "guardia" experience, students visit small health clinics as participant observers, the amount of their participation varying widely.

In brief, curricular analysis in itself suggests numerous deficiencies in the clinical training provided by medical schools in Italy and other European countries. Deficiencies are less apparent on the transcripts of students from Guadalajara and other Mexican schools. Comments made by USFMS provide additional insight into the quality of the clinical instruction provided by foreign medical schools.

(2) Views On Clinical Deficiencies Expressed By USFMS

As might be expected from the brief analysis of curricula presented above, students who have attended foreign medical school complain about the absence or poor quality of clinical instruction with marked frequency. Exhibit XVI, following this page, indicates the number of students expressing complaints about various areas of clinical instruction. As shown in the exhibit, 39 of the 125 students commenting on their experiences, or 31 percent, criticized clinical training overall--generally because it was absent or minimal. It is somewhat surprising that this rate is not higher, given the apparent gaps in training. Of the various clinical skill categories, patient contact, clinical correlation, patient history taking, and patient diagnosis were criticized most often.

Exhibit XVII, following Exhibit XVI, analyzes the above data by country of foreign medical school. Both Mexican and European foreign medical schools had approximately the same rate of complaints--about 28 percent of the students reporting.

EXHIBIT XVI

Health Resources Administration
FREQUENCY DISTRIBUTION OF DEFICIENCIES
IN CLINICAL INSTRUCTION CITED BY USFMS

Foreign Medical School*	Number of USFMS Attending **	Number of USFMS Reporting										
Guadalajara	126	71	4	10	3	8	7	5	—	—	1	13
Noreste	15	12	—	—	1	--	—	—	5	2	--	9
Juarez	10	6	--	--	--	--	--	--	2	--	--	3
Monterrey	7	5	—	1	--	1	--	—	—	1	—	1
Xochicalco	6	5	1	2	--	2	--	1	--	3	--	2
Chihuahua	2	5	—	—	—	1	—	1	1	2	—	--
MPI	1	1	—	1	--	—	—	—	--	--	--	--
Nuevo Leon	1	1	--	--	--	--	--	--	--	--	--	1
Total Mexico	168	103	5	14	4	12	7	7	8	8	1	29
Rome	18	6	—	—	—	—	—	--	4	—	—	--
Padova	4	3	—	—	—	—	—	--	—	—	—	2
Florence	3	2	—	--	—	--	—	--	2	--	--	2
Genoa	2	1	—	—	—	—	—	—	1	—	—	—
Milan	1	1	--	--	--	--	--	--	--	1	--	--
Total Italy	28	13	—	—	—	—	—	—	7	1	—	4
Cu Lille (France)	4	2	--	—	—	—	--	—	—	—	—	1
Far Eastern	18	3	—	—	—	—	—	—	—	—	—	3
Santo Tomas	4	2	--	--	--	--	--	--	--	--	--	1
Total Philippines	22	5	—	—	—	—	—	—	—	—	—	4
Central Del Este (Dominican Republic)	2	1	--	—	—	—	—	—	—	1	--	--
St. George's (Grenada, West Indies)	1	1	—	--	—	—	—	—	--	—	—	1
GRAND TOTAL	225	125	5	14	4	12	7	7	15	10	1	39

Notes: *Includes only schools cited for their deficiencies.
**Includes Columbia (Category 1) students and Cornell students, two not represented in the overall database.

EXHIBIT XVII
Health Resources Administration

FREQUENCY DISTRIBUTION OF DEFICIENCIES IN CLINICAL INSTRUCTION CITED BY MEXICAN AND EUROPEAN STUDENTS

XICAN SCHOOLS*											
mber Attending**	168										
mber of Informants	108										
mber Citing Deficiencies		5	14	4	12	7	7	8	8	1	29
rcent of Informants Citing Deficiencies		4.9	13.6	3.9	11.7	6.8	6.8	7.8	7.8	0.97	28.2
ROPEAN SCHOOLS*											
mber Attending**	35										
mber of Informants	18										
mber Citing Deficiencies		--	--	--	--	--	--	7	1	--	5
rcent of Informants Citing Deficiencies		--	--	--	--	--	--	38.9	5.6	--	27.8

A detailed presentation of the actual comments offered by USFMS is given in Appendix C of Volume III. In general comments centered on the following:

- Deficiencies in clinical instruction and opportunities were appreciable in both European and non-European schools.

- The limited number of complaints about specific skill areas, especially by students from European schools, may be related to the total absence of this training from their foreign medical experiences.

- Some students from Mexican schools commented unfavorably about the competence and experience of their clinical instructors.

- Some students from Mexican schools also noted their limited or nonexistent exposure to the hospital setting. As noted in a summary of the Guadalajara curriculum: "The guardia (community medicine) experience varies widely, depending upon the knowledge of the pasante (a 5th year student-instructor) and of the student. Guardias are done in clinics in low income urban areas and in rural areas where equipped mobile units are used. the guardias are designed to provide general medical and emergency care as well as to teach preventive medicine and sanitary education. Students doing guardias during their first semester often find themselves seeing patients without having had a physical diagnosis course. In addition, they find themselves dispensing drugs (often beyond their expiration dates) without having had pharmacology. If the pasante is interested, he supervises the student closely; if not, the student is unsupervised...."

The anecdotal information presented in this chapter derives from the USFMS themselves. In addition, some grantees expressed views on deficiency in the foreign medical education of USFMS based on general experience, on interviews with the student group, and on test results. Because grantees so often reflect the views of their USFMS, their statements are not analyzed in the text. However, these statements are included in this report as Appendix D of Volume III.

(3) USFMS Performance Based On Clinical Skills Examinations

Based on a review of anecdotal comments by the USFMS and a comparison of typical foreign medical curricula and U.S. medical school curricula, we would expect the USFMS to exhibit deficiencies in clinical skills. Unfortunately,

there is no clinical skill counterpart to the NBME Part I examination for second-year students (Parts II and III are clinically oriented but are not administered until all course work is completed).

Each grantee was requested to describe the procedures used to evaluate the clinical skills of its USFMS group and to provide test results. Since uniform testing procedures and instruments were not employed, the grantees were requested to include test scores for their USMS to serve as a reference point for interpreting USFMS test results.

Exhibit XVIII, following this page, presents a summary of the individual grantee evaluations of USFMS clinical skills. Some grantees evaluated basic science skills as well as clinical skills. Wherever possible, we calculated the percentage of USFMS who were deficient in each area. Criteria for determining deficiencies were:

- An explicit or implicit reference score for USMS
- The indicated number of USFMS below the reference point

If means and standard deviations were presented, t-tests were performed to determine the significance level of the difference between USFMS and USMS. In several cases, deficiencies were inferred on the basis on admission status, i.e., admission to the second year and not the third was interpreted as grantee recognition or assumption of clinical deficiencies.

As shown in the exhibit, nearly every grantee reported substantial deficiencies in two clinical areas:"

- Physical examination
- Medical history taking

The next areas of greatest clinical deficiency were:

- Patient management
- Patient interviewing

It should be noted that the four clinical areas most commonly cited as deficient were also the areas most commonly assessed. Taxonomy is a problem here. Some grantees measured clinical performance in uniquely named areas, finding substantial weaknesses in "Instrumentation," "Clinical Concepts and Skills," and "Clinical Psychiatry." But, most important, all of the grantees submitting data emphasized that the USFMS were very deficient in clinical skills.

EXHIBIT XVIII

Health Resources Administration

SUMMARY OF GRANTEE EVALUATIONS OF USPHS CLINICAL SKILLS

		Social and Behavioral Sciences	Physical Exam	Patient Management	Pulmonary	Cardiology	Gastrointestinal	Endocrinology	Neurology	Musculoskeletal	Sex Organs, Reproduction	Medical History	Patient Interviewing	Case Presentation	Pathophysiology	Pathology	Physiology	Clinical Psychiatry	Instrumentation	Clinical Correlation	Basic Sciences	Clinical Concepts and Skills	Anesthesiology	Infectious Diseases	Renal; Ob/Gyn, GI	Nutrition, Rheumatology	Neuroscience	Reticuloendothelial System
Category II	Arizona		100%									70%				69%				45%								
	Boston		60%	60%								60%	60%															
	Buffalo	(a)	(a)								(a)	(a)						(a)			(a)							
	Chicago		100%									100%							100%									
	Cornell (b)		67%	98%								65%	71%															
	GW/GT		100%	100%								85%	100%															
	Georgia		100%	100%	80%	40%		30				100%						100%					20%	80%	0%	100%	80%	20%
	Howard (c)		60%									60%																
	Iowa		(d)									(d)	(d)															
	Michigan State	100%														100%					100%							
	Missouri	100%	88%	100% (e)																								
	New York Med (a)	(a)	(a)									(a)		(a)	(a)													
	Northwestern (f)		100%									100%																
	Pittsburg		(g)									(g)																
	Rush				(h)			(h)		(h)	(h)						(h)								(h)			
	Columbia (Category I Program)																				56% (i)	(e)						

(a) The grantee provided no comparative scores or passing score and, therefore, it was impossible to estimate a rate of deficiency. Historically, a majority of USPHS have been found deficient in these areas.

(b) Based on normal deviate percentile rank for "below average or worse."

(c) Only two of five students were considered clinically experienced enough to enter the third year. It may be noted in passing that the three students repeating the second year at Howard were experiencing repetition in the basic sciences.

(d) All students were considered deficient in the areas on the basis of comparison between the Iowa curriculum and FMS curricula as well as interviews with prospective students. Accordingly, all students were required to enter the second year of Iowa's medical program.

(e) Six out of eight students were admitted to the second year. The other two students, who were considered reasonably prepared to enter the third year, required assistance in patient management.

(f) The grantee assumed that its group of USPHS possessed all possible deficiencies in the areas of physical examination, medical history, and clinical psychiatry.

(g) Sample of USPHS significantly poorer than Pittsburg sophomores: $t_{(26)} = 3.78$, $p < .01$.

(h) Sample of USPHS significantly lower than the Rush sophomore sample (all tests $p < .05$ except "pulmonary," which was rejected at $p < .10$ level.)

(i) Columbia employed an NBME "shelf copy" to evaluate deficiencies in the basic sciences among the USPHS enrolled in its Category I program. (A total score of 380, the passing score for June 1978, was used as a cut-off in determining a rate of deficiency in the basic sciences.)

5. EFFECTIVENESS OF GRANTEE PROGRAMS IN REMEDYING DEFICIENCIES

Grantees were requested to provide information on the effectiveness of their programs in remedying deficiencies in the foreign medical education of USFMS. In most cases, some effort was made to document specific areas of improvement in USFMS performance between admission to and completion of the remedial program. Only general conclusions could be drawn from these data, since:

- Rigorous evaluation research designs were not within the scope of the study.
- In most grantee programs, the number of USFMS was too small for meaningful evaluation.
- Frequently there were no reference scores available (i.e., comparable scores for USFMS)
- No two grantees used the same instruments to evaluate their programs.
- The operating objectives of several programs could not be easily evaluated; for instance, some schools employed level of USFMS placement (second vs third year) as the mechanism for assuring remediation of deficiencies.

Despite the above restrictions, we can conclude that the results of the grantee self-evaluation were positive. Where data were available, improvement in clinical skills, both process and content, was usually demonstrated. The USFMS's basic science skills, discussed previously, were not often seen as weaknesses and, therefore, few grantees focused remediation in these areas.

Exhibit XIX, following this page, presents the results of pre- and post-course comparisons by individual grantee. The exhibit indicates that appreciable gains in performance were realized by the USFMS. Significant improvement (at the .05 level or less) was found in nearly every grantee program.

EXHIBIT XIX(1)

Health Resources Administration

PROGRAM EFFECTIVENESS AS REPORTED BY INDIVIDUAL GRANTEE

	Pre	Post	Significance Level
ARIZONA			
o Pathology	$\bar{X}$ = 66.6	86.5	.05
o Physical Examination	$\bar{X}$ = 48.6	89.5	.05
o Medical Interview Process	$\bar{X}$ = 66.9	85.4	.05
o Medical Interview Content	$\bar{X}$ = 62.9	78.0	.05
o Neurology Examination	$\bar{X}$ = 89.7	94.5	.10
o Pulmonary Examination Performance and Content	USFMS $\bar{X}$ superior to USMS $\bar{X}$ at initial testing		
o Cardiovascular Examination Performance and Content	USFMS superior or equal at initial testing		

In each area, USFMS final performance was equivalent to USMS performance.

BOSTON			
o Basic Sciences	$\bar{X}$ = 52.4	57.2	.05
o Physical Diagnosis	60% Failure	0%	

BROWN--No data available.

BUFFALO			
o Embryology	$\bar{X}$ = 55	55	ns
o Histology	$\bar{X}$ = 57	59	ns
o Neuroanatomy	$\bar{X}$ = 64	73	.05
o Gross Anatomy	$\bar{X}$ = 38	58	.05
o Biochemistry	$\bar{X}$ = 42	42	ns
o Physical Diagnosis	$\bar{X}$ = 64	72	.10
o Microbiology	$\bar{X}$ = 58	49	.05
o Pathology	$\bar{X}$ = 65	64	ns
o Pharmacology	$\bar{X}$ = 46	60	.05

o Physiology	$\bar{X}$ = 58	61	ns
o Human Behavior	$\bar{X}$ = 49	79	.05
o Human Sexuality	$\bar{X}$ = 70	82	.05
o Psychodynamics	$\bar{X}$ = 56	83	.05

No USMS comparative data were available.

	Pre	Post	Significance Level
CHICAGO			
o Medical History	0% (% Satisfactory)	100%	
o Instrumentation	38%	100%	
o Physical Examination	20%	100%	
o Basic Sciences	$\bar{X}$ = 58.02	59.28	ns
COLUMBIA			
NBME			
o Anatomy	$\bar{X}$ =388	467	ns
o Physiology	$\bar{X}$ =384	473	.05
o Biochemistry	$\bar{X}$ =377	485	.05
o Pathology	$\bar{X}$ =370	498	.05
o Microbiology	$\bar{X}$ =352	480	.05
o Pharmacology	$\bar{X}$ =423	488	ns
o Behavioral Sciences	$\bar{X}$ =395	498	.05
o Total	$\bar{X}$ =356	478	.05
CORNELL			
o Medical History Taking o Physical Examination o Patient Interviewing	$\bar{X}$ = 4.71	9.47	.05
o Problem Analysis			

Scale based on expected performance of beginning third-year Cornell medical students:

14 - honors
12 - near honors
10 - above average
8 - average
6 - below average
4 - poor passing
2 - failing

EXHIBIT XIX(3)

	Pre	Post	Significance Level
GEORGE WASHINGTON/GEORGETOWN			
All students received passing grades (based on normal school standards) at end of course in:			
o Physical Examination			
o Clinical Procedures			
o Red Cross CPR			
o Patient Interviewing			
o Medical History Taking			
o Medical Records			
No pre/post comparison data available.			
GEORGIA			
o Clinical Medicine	$\bar{X}$ = 62	77	.05
o Physical Diagnosis	$\bar{X}$ = 71	80	.05
o Endocrinology	$\bar{X}$ = 76	84	.05
o Infectious Disease	$\bar{X}$ = 62	77	.05
o Neuroscience	$\bar{X}$ = 63	78	.05
o Hematology	$\bar{X}$ = 47	80	.05
HOWARD			
No pre/post data available.			
IOWA			
No pre/post data available.			
MARYLAND			
No pre/post data available.			
MT. SINAI			
o Medical History (Process)	$\bar{X}$ = 49.3	67.6	.05
o Medical History (Content)	$\bar{X}$ = 46.9	65.5	.05
o Physical Examination (Process)	$\bar{X}$ = 45.0	89.1	.05
MICHIGAN			
All six USFMS were initially diagnosed as deficient in three areas at admission:			

EXHIBIT XIX(4)

	Pre	Post	Significance Level
MICHIGAN (continued)			
o Pathology/Clinical o Behavioral o Basic Sciences			
All six were evaluated on a different basis as satisfactory in these three areas after course work.			
MISSOURI			
Social/Behavioral Science	$\bar{X}$ = 50.9	74.5	.05
Clinical skills were assessed according to level of entry (second or third year). No post-test data were available.			
NEW YORK MEDICAL COLLEGE			
o Medicine	$\bar{X}$ = 54.4	64.4	.05
o Behavioral Science	$\bar{X}$ = 14.9	16.8	.05
o Physical Diagnosis	$\bar{X}$ = 56.9	79.0	.05
NORTHWESTERN			
Written History and Physical	$\bar{X}$ = 68.7	85.0	.05
All students were initially deficient in medical histories and physical examinations, and all met Northwestern standards by end of remedial program.			
PITTSBURGH			
Physical Diagnosis	$\bar{X}$ = 71.8	89.1	.05
Post-test results comparable to regular Pittsburgh student performance.			
RUSH			
Clinical Concepts--equivalent for USFMS and USMS.			

Supplementing the test results, comments made by individual grantee faculty and project directors overwhelmingly support the effectiveness of the programs. Most have reported that:8/

8/ Major exceptions to this process are the four schools (Iowa, Georgia, Howard, and Missouri) that entered at least some of the USFMS into the second rather than the third of medical school year.

- USFMS enter the program with relatively limited basic science deficiencies

- USFMS usually enter the program with little clinical experience or course work

- USFMS are highly motivated, reasonably intelligent students and can be brought up to USMS clinical proficiency through a fairly modest remedial program

A final bit of confirming evidence may be found in the highly positive ratings that programs received from students. Available data suggest that the majority of USFMS felt they had gained something valuable from participating in a Section 782 program--specifically self-confidence and feelings of acceptance as well as new knowledge and skills.

6. REQUIRED ACCOMMODATIONS IN CURRICULA TO MEET USFMS NEEDS AND OVERALL IMPACT ON GRANTEES

In general, extensive efforts were not required to remedy deficiencies in USFMS skills and knowledge. The select group of USFMS participating in this program did not require extensive remediation; morever, they tended to be eager and apt learners. Accordingly, the cost of the program was relatively modest. Although detailed expenditure data were not available, the average grant amount of $54,000 should approximate the costs actually incurred. Costs were lower in programs that used advanced students and/or residents as preceptors for the USFMS.

Specifically, none of the medical schools indicated that the Section 782 program was a burden, or that a substantial effort was required to bring the USFMS to the level of their regular students. Relatively modest efforts were required to develop new curricula; in many cases, existing curricula were modified with minimal effort. Further, several project directors indicated that they planned to incorporate some of the remedial courses and evaluation measures into their regular curriculum.

A more detailed discussion of the impact of the program on the grantees follows:

- Changes in Curriculum--Grantees found various ways to integrate transfers into the existing program. Three of the 19 grantees felt it necessary to enroll some of their transfers in the second rather than the third year, specifically students deficient in pathology as well as clinical correlation and clinical skills. One grantee chose to enroll a USFMS in the second year because this is the point at which an intense introduction to clinical

medicine is offered. Otherwise, grantees keyed their summer programs to the specific deficiencies that the transfers exhibited and planned to provide individual tutoring during the year for those with residual problems.

- Although grantees did not perceive themselves as "changing their curricula to meet the needs of a small group," some grantees used the Section 782 program as an opportunity for enhancing their existing courses. The following comments of individual grantee staff demonstrate this benefit:

  - The program had a positive influence on the institution's educational activities, providing faculty with an opportunity to prepare educational objectives and to base test items on these objectives.

  - The self-instructional material developed for the transfers became available to the larger student body, thus enriching the medical program for all.

  - The curriculum guide developed for the program was expected to have a significant impact on the regular curriculum. For the first time, academic departments had the opportunity to see the course content as presented by each discipline in an organized and coherent fashion.

  - Many grantees suggested that the program experience forced them to reexamine their own course content and instructional approaches.

  - Some grantees reported that a number of USFMS requested the opportunity to attend similar "remedial" courses.

- Changes In Clinical Clerkships--Many schools had to juggle their clerkships schedules to meet the needs of the 782 students. In some cases additional staff were recruited to assist with clinical training and, in other cases, the grantees were forced to dilute the faculty/student ratio. No other significant changes were made, however.

- Increased Faculty Load--The program added to the teaching burden of most schools, but only to a limited extent. In a few cases, additional lecturers or preceptors were hired; but more often, the extra work was absorbed by existing personnel, many of whom take a special interest in the educational process. The fact sheets on individual

programs presented in Appendix A of Volume III describe staff utilization in more detail.

- Additional Equipment And Facilities--Naturally, the need for equipment and facilities varied with existing utilization rates and with the nature of the grantee's 782 program. For instance, additional slide sets, projectors, texts, cadavers, study rooms, videotape equipment, etc. were purchased in some cases. However, because the programs took place mainly in the summer, when regular classrooms were often vacant and equipment was unused, additional capital investments for the programs were fairly small.

IV. CONCLUSIONS

IV. CONCLUSIONS

This chapter presents our overall conclusions on deficiencies in the foreign medical education of U.S. foreign medical students. Initially we summarize the findings presented in Chapter III on deficiencies in the basic and clinical sciences. We then discuss efforts undertaken by the grantees to remedy the deficiencies and the impact of the USFMS on grantees. Finally, we discuss the implications of the findings on the U.S. undergraduate medical education system.

1. IN GENERAL, THE FOREIGN MEDICAL EDUCATION OF U.S. FOREIGN MEDICAL STUDENTS APPEARS TO HAVE MAJOR DEFICIENCIES IN THE CLINICAL SCIENCES, BUT RELATIVELY LIMITED DEFICIENCIES IN THE BASIC SCIENCES.

As indicated in earlier chapters, there were two basic ways used to measure deficiencies: (1) a comparison of the curricula, faculty, and teaching methods of U.S. and foreign medical schools, and (2) a comparison of the performance of USFMS and USMS on standardized and nonstandardized examinations.

Using these methods, our study found that the performance of USFMS in the basic sciences was not substandard. The USFMS NBME Part I mean scores were equal to or greater than the USMS means. The equality of USFMS and USMS after two years of disparate education might be somewhat surprising, particularly since the USFMS were inferior to USMS on pre-medical performance measures (i.e., undergraduate GPA and MCAT scores). Although the basic science curricula of foreign schools appeared to be acceptable, various deficiencies were noted in certain basic science courses and teaching methods. As discussed in Chapter III, the great majority of basic science courses considered integral to the first two years of undergraduate medical education were found in the foreign medical school curricula. The course absence rate was less than 11 percent for all basic science courses except behavioral science. However, anecdotal information suppied by USFMS indicated various deficiencies in their basic science education. For example, many students noted the absence or limited emphasis on laboratory work in such courses as anatomy, physiology, microbiology, and pathology. Instruction in physical dissection was considered weak; the difficulty in obtaining satisfactory cadavers was noted. Further, laboratory equipment and facilities, audiovisual equipment, and teaching aids used in support of basic science instruction were described as deficient by many students. Students also complained about the emphasis on lectures and "rote" learning, as opposed to problem-oriented approaches and student-faculty interaction. The extent of deficiencies reported varies somewhat between Mexican and European medical schools. However, there are enough common items to suggest that foreign medical education in the basic sciences may be different from that offered by U.S. medical

schools and that these differences eventually may prove significant.

Thus, there may not be a strong relationship between foreign medical education in the basic sciences and the performance of USFMS on the NBME Part I examinations. In addition, essentially all USFMS had some language barrier to overcome, which could only interfere with their studies. Further, many USFMS indicated that their English textbooks were their primary source of information, i.e., the quality of instruction in the foreign medical school was almost incidental to their education.

The latter point provides a more likely explanation for the relatively strong performance on standardized tests by the USFMS at the time of transfer to U.S. medical schools. The USFMS group in the current study were usually characterized as "highly motivated" or "aggressive learners" by grantee faculty. Although most of these students were originally rejected by U.S. medical schools, they were apparently determined to study medicine even if they had to endure the extra stress associated with studying in a foreign school. Consequently, they relied to some extent on individual self-study to gain the basic science knowledge that USMS are expected to have at the end of their second year of medical school.

The apparent high motivation of these students was demonstrated by the performance of the USFMS in the various Section 782 remedial programs. Grantee staff emphasized the strong initiative and hard work displayed by the USFMS during the remedial programs. The grantees also indicated that the students had apparently compensated for the foreign medical school deficiencies they encountered by self-study and by expending a great deal of energy in preparing for the NBME Part I examination.

Thus, in the basic sciences area, certain deficiences do apparently exist in the foreign medical education of USFMS. However, these students were apparently able to compensate for these through self-study and thus to perform adequately on the NBME Part I examination.

Students were apparently less able to compensate for deficiencies in the clinical training provided by foreign medical schools. As indicated in Chapter III, such deficiencies were considerably greater in the clinical skills areas then in the basic sciences. Generally, the USFMS received far less clinical training than most USMS in the first two years of medical school. Contact with patients in the first two years in foreign medical schools was reported as very limited. Training in physical diagnosis, medical history taking, patient interviewing and case presentation and writing were reported as deficient by many of the USFMS and grantee faculty. These deficiencies were corroborated by clinical examinations that

many grantees gave to USFMS upon their entry into the remedial programs.

Some of the USFMS compensated for clinical skill deficiencies by seeking externships in the U.S. or by paying for special supervision. These students, who had performed a number of physical examinations, were rated much higher than other Section 782 peers.

Thus, the results suggest appreciable deficiencies in the clinical foreign medical education of USFMS. In some cases, particularly in the European schools, clinical skills are not taught until the last two years (usually fourth and fifth). The numerous clinical deficiencies observed may be largely due to timing differences rather than differences in standards. However, very few USFMS were able to compensate for these deficiencies before transfer to the U.S. medical schools.

2. THE GRANTEES WERE APPARENTLY SUCCESSFUL IN REMEDYING DEFICIENCIES IN THE FOREIGN MEDICAL EDUCATION OF USFMS

In general, the grantees were very satisfied with the improvements realized by USFMS as a result of the remedial programs. As discussed in Section 5 of Chapter III, we can conclude that the grantee programs were successful in remedying the deficiencies identified in the transfer group. USFMS who completed the program and entered the third year were considered ready. Where evaluative test results are available, they indicate that the USFMS performed satisfactorily after completing the program. What was needed in a great many cases was the practical experience of examining patients, taking patient histories, developing diagnoses, and other patient management related activities. By and large, students responded very well to the remedial programs which led to two consequences:

- Grantee faculty recognized that the USFMS had the ability to perform well once given the appropriate training.
- USFMS generally gained increased confidence in their capacity to function as physicians.

The latter result was considered the most important program benefit by a number of grantee staff.

The long-term success of the Section 782 program cannot be determined until the students have progressed further in their medical education. Standardized clinical assessments are made at the end of the fourth year (NBME Parts II and III), and these test results of the USFMS study group would be useful in performing a more intensive evaluation of the grant program and student deficiencies in particular.

3. DEFICIENCIES IN THE FOREIGN MEDICAL EDUCATION OF THE USFMS WERE ABLE TO BE REMEDIED WITH A RELATIVELY MODEST EXPENDITURE OF RESOURCES

In general, as discussed in Chapter III, the remedial programs prompted few changes in regular curricula, and required very few additions of new faculty. Many grantees described the program as an extension of services that their schools normally provided (or should be providing) for indigenous students.

The average budget of the grantee program ($54,000,) is a rather modest sum in comparison to the annual budget of most U.S. medical schools. Considering that the transfer students are, for the most part, entering the post-laboratory years of medical school, the cost of their U.S. medical education is relatively low compared to that of USMS.

4. THE OVERALL IMPACT OF THE USFMS ON THE UNDERGRADUATE MEDICAL EDUCATION SYSTEM CLEARLY DEPENDS ON THE TYPE AND NUMBER OF STUDENTS PARTICIPATING IN THE PROGRAM

Programs to remedy deficiencies in clinical skills may be provided at relatively moderate cost--at least for the small student group served in the current programs. The performance of the USFMS was improved substantially by the end of the program, and the USFMS were, for the most part, easily assimilated into the regular program of the schools. The grantees reported little difference in specialty selection or quality of residencies for prior USFMS groups and indigenous students. The ability of the USFMS to perform as well as the USMS is particularly signficant in light of their inferior premedical performance (GPA and MCAT scores).

Naturally, the above conclusions must be tempered by the size of the grant program and the characteristics of the USFMS populations. If the number of students transferring increased by three- or fourfold, the burden on the grantees could be substantial. Further, as discussed in Chapter III, the USFMS served in the Section 782 program constituted a very select group, with skills probably exceeding those of the typical U.S. student studying abroad. If the transfer program were expanded and if admissions policies were less restrictive, the student deficiencies facing grantees would probably be greater, resulting in a much greater impact on grantee resources.

Clearly, the increased costs of continuing and/or expanding the program must be weighed against the nationwide manpower requirements for U.S. physicians before any decisions are made. Arguments have been offered in the past that the USFMS who transfer to U.S. medical schools are more service-oriented than USMS and thus might be a good source of manpower for underserved areas of the country. On the other hand, as indicated earlier, USFMS are easily assimilated into the regular student population and, as some grantees have reported, are "indistinguishable"

from the USMS at the completion of medical school. Thus the use of this program to support physician manpower requirements in underserved areas of the country is questionable.

* * * *

In summary, certain deficiencies in the foreign medical education of USFMS were identified. These were remedied by the grantee schools at a relatively modest cost. Decisions on program expansion need to be weighed against the increases in program cost and the benefits of the program in remedying student deficiencies and in supporting U.S. physician requirements.